# Exhibit 31

**UNITED STATES DISTRICT COURT**

**SOUTHERN DISTRICT OF NEW YORK**

| | |
|---|---|
| MEGAN VILLELLA, Individually and on Behalf of All Others Similarly Situated, <br><br> Plaintiff, <br><br> vs. <br><br> CHEMICAL AND MINING COMPANY OF CHILE INC., et al., <br><br> Defendants. | Civil Action No. 1:15-cv-02106-ER-GWG <br><br> (Consolidated) |

**REBUTTAL EXPERT REPORT OF WALTER N. TOROUS, PH.D.**

December 12, 2018

**TABLE OF CONTENTS**

## I.      INTRODUCTION

### A.      Qualifications

1.      I, Walter Torous, am a Senior Lecturer at the Massachusetts Institute of Technology with a joint position at the Sloan School of Management and the Center for Real Estate.  I am also a Professor Emeritus and the former Lee and Seymour Graff Endowed Professor at the John E. Anderson School of Management at the University of California at Los Angeles.  I am a member of the American Finance Association and the Western Finance Association.  I received my Ph.D. degree in Economics from the University of Pennsylvania in 1981.  I have taught courses in managerial finance at the master's level and empirical methods in finance at the doctoral level.

2.      My areas of research include fixed income securities and derivative instruments, the pricing of securities (including stocks, risky debt, options, futures, and mortgages), the reorganization of financially distressed firms, the behavior of interest rates, and statistical issues in finance.  I have published peer-reviewed articles on event studies,[1] as well as market efficiency,[2] the pricing of stocks, and the valuation of a variety of financial instruments including options, futures, corporate debt, and mortgage-related securities.  I have spoken at numerous academic and business conferences about my research.  I am currently, or have been, the editor or associate editor of a number of finance journals, including the *Pacific-Basin Finance Journal*, *Economic Notes*, and *the Journal of Real Estate Finance and Economics*.  I am currently, or have been, an *ad hoc* referee for

---

[1]    *See*, *e.g.*, Clifford A. Ball and Walter N. Torous, "Investigating Security Price Performance in the Presence of Event-Date Uncertainty," *Journal of Financial Economics* 22, 1988, pp. 123-153.

[2]    *See*, *e.g.*, H. Hong, et al., "Do Industries Lead Stock Markets?", *Journal of Financial Economics*, 83:2, 2007, pp. 367-396.

several finance journals, including the *Journal of Finance*, *Journal of Financial and Quantitative Analysis*, *Review of Financial Studies*, *Journal of Financial Economics*, and the *Journal of Empirical Finance.*

3.    My complete curriculum vitae, which includes a list of my publications, is attached as **Appendix A** to this report.  **Appendix B** lists my testimony in the past four years.

**B.    Assignment**

4.    I have been retained by Milbank, Tweed, Hadley & McCloy LLP, counsel for Sociedad Química y Minera de Chile S.A. ("SQM"), to respond to the Expert Report of Bjorn Steinholt ("Steinholt Report"), which was submitted in this matter in support of Plaintiff's motion for class certification.  Counsel has asked me to evaluate Mr. Steinholt's opinion that SQM's American Depositary Shares ("ADS") traded in an open, developed, and efficient market at all times during the class period proposed by Plaintiff: June 30, 2010 through March 18, 2015 (the "Proposed Class Period").

5.    In performing my research and analyses, I have relied upon the documents and data listed in **Appendix C** and/or cited in this report and exhibits.  My work on this matter is ongoing, and I may review additional materials or conduct further analysis.  I reserve the right to update, refine, or revise my opinions.

6.    My hourly rate for time I spend on this matter is $800 per hour.  In addition, I receive compensation based on the professional fees of Analysis Group, Inc. ("Analysis Group"), a financial and economic consulting firm, which has provided research support under my direction and supervision.  My fees and Analysis Group's fees do not depend upon the opinions I form nor upon the outcome of this litigation.

**II.      OVERVIEW OF MARKET EFFICIENCY IN THE CONTEXT OF SECURITIES CLASS ACTIONS AND MR. STEINHOLT'S APPROACH TO ASSESSING MARKET EFFICIENCY**

7.      Economists consider a market for a stock efficient when it quickly impounds new and material information into a stock's price.  There are three recognized variants of the efficient market hypothesis, distinguished by the degree and type of information incorporated into a stock's price:

> 1)  **Weak-form efficiency:**  Under this theory, the price of a stock quickly incorporates all of the information contained in the history of prior stock prices.  That is, future price movements cannot be predicted based on past price movements.
>
> 2)  **Semi-strong-form efficiency:**  Under this theory, the price of a stock quickly incorporates all publicly available information.
>
> 3)  **Strong-form efficiency:**  Under this theory, the price of a stock quickly incorporates both public *and* private information.[3]

8.      As Mr. Steinholt acknowledges, each form of efficiency builds on the previous form such that weak-form efficiency is a prerequisite for semi-strong form efficiency, and semi-strong form efficiency is a prerequisite for strong-form efficiency.[4]

9.      In the context of securities litigation, the term "market efficiency" typically refers to the semi-strong form.[5]  Efficient markets theory posits that investors rely on the market price of a security because prices quickly impound all publicly available information about the

---

[3]      *See*, *e.g.*, Eugene Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance*, 1970, pp. 383-417.

[4]      Deposition of Bjorn Steinholt, November 9, 2018 ("Steinholt Deposition"), p. 75.

[5]      The Supreme Court has stated that "the Court [in *Basic*] relied upon the 'semi-strong' version of [efficient markets] theory, which posits that the average investor cannot earn above-market returns (*i.e.*, 'beat the market') in an efficient market trading on the basis of publicly available information."  *Halliburton Co. v. Erica P. John Fund, Inc.*, 134 S. Ct. 636 (2013).  Mr. Steinholt testified that he assessed SQM's ADS price reaction to publicly available information, which "would be most consistent with the semi-strong form" of efficiency. Steinholt Deposition, p. 77.

value of the security.[6]  This reliance is the basis for the fraud-on-the-market presumption

central to securities class actions.  For example, as discussed in the *Basic v. Levinson*

decision:

> The fraud on the market theory is based on the hypothesis that, in an open
> and developed securities market, the price of a company's stock is
> determined by the available material information regarding the company
> and its business. . . . Misleading statements will therefore defraud
> purchasers of stock even if the purchasers do not directly rely on the
> misstatements. . . . The causal connection between the defendants' fraud
> and the plaintiffs' purchase of stock in such a case is no less significant than
> in a case of direct reliance on misrepresentations.[7]

10.    To assess market efficiency, Plaintiffs' expert Mr. Steinholt evaluated two sets of factors:

(1) the five "*Cammer* factors," as enumerated in *Cammer v. Bloom*, 711 F. Supp. 1264

(D.N.J. 1989); and (2) the three "*Krogman* factors," as described in *Krogman v. Sterritt*,

202 F.R.D. 467 (N.D. Tex. 2001).[8]  The five *Cammer* factors are:

1) whether the stock exhibited "average weekly trading of two percent or
   more of the outstanding shares";

2) whether a "significant number of securities analysts followed and
   reported on a company's stock during the class period";

3) whether the "stock had numerous market makers" or other evidence of
   "arbitrageurs";

4) whether the "Company was entitled to file an S-3 Registration Statement
   in connection with public offerings"; and

5) whether there are "empirical facts showing a cause and effect
   relationship between unexpected corporate events or financial releases
   and an immediate response in the stock price."

---

[6]    *See*, *e.g.*, Richard A. Brealey, et al., *Principles of Corporate Finance*, Tenth Edition, 2011, p. 330; Eugene Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance*, 1970, pp. 383-417.

[7]    *Basic, Inc. v. Levinson*, 485 U.S. 224, 241-242 (1988).

[8]    Expert Report of Bjorn I. Steinholt, CFA, January 10, 2018 ("Steinholt Report"), ¶¶ 17-18, 58.

11.     As described by Mr. Steinholt, the first four *Cammer* factors are often referred to as "indirect" indicators of market efficiency.[9]  The fifth *Cammer* factor, as Mr. Steinholt also acknowledges, "provides direct evidence of market efficiency."[10]  The *Cammer* decision describes this fifth factor (the existence of a cause-and-effect relationship between unexpected news and a response in the stock price) as the "essence of an efficient market."[11]

12.     Mr. Steinholt also evaluated the three *Krogman* factors, which include:

1) The capitalization of the company;

2) The bid-ask spread of the stock; and

3) The percentage of stock not held by insiders.

13.     Mr. Steinholt assesses the *Cammer* and *Krogman* factors in two ways:  his analyses of (1) the indirect *Cammer* and the *Krogman* factors (or all of the factors other than the fifth *Cammer* factor) and (2) the fifth *Cammer* factor.  To evaluate the fifth *Cammer* factor, Mr. Steinholt conducts two sets of analyses: (1) an analysis of the price reaction to SQM's 19 financial releases during the Proposed Class Period,[12] and (2) an analysis of SQM's ADS price reaction following an alleged corrective disclosure on March 18, 2015, the last day of the Proposed Class Period.[13]

---

[9]     Steinholt Report, ¶ 17.

[10]    Steinholt Report, ¶ 18.

[11]    *Cammer v. Bloom*, 711 F. Supp. 1264, 1287 (D.N.J. 1989).

[12]    Steinholt Report, ¶ 40.

[13]    Steinholt Report, ¶¶ 41-45.

14.     Based on his collective evaluation of these factors, Mr. Steinholt concluded that SQM's

ADS traded in an "impersonal, open, well-developed, and efficient" market.[14]

Specifically, he found that "new and material information about SQM was widely

disseminated to the market, analyzed by market participants and traded on, causing the

information to quickly become reflected in the Company's ADS price."[15]  Mr. Steinholt

further concluded that he "found no evidence of market inefficiency."[16]

## III.     SUMMARY OF OPINIONS

15.     In my opinion, Mr. Steinholt's analysis does not provide evidence from which one can

reasonably conclude that SQM's ADS traded in an open, developed, and efficient market

at all times during the Proposed Class Period.  The following is a summary of my

opinions in reaching this conclusion:

- *The indirect Cammer and Krogman factors are insufficient to establish market efficiency*.  Academic studies demonstrate the inadequacy of indirect indications of market efficiency.  The literature includes many examples of stocks that, although satisfying these supposed indicators of market efficiency, traded in inefficient markets.  **(Section IV.)**

- *The fifth Cammer factor is the most important in assessing whether a security traded in an efficient market.*  The fifth *Cammer* factor is the only *Cammer* or *Krogman* factor that provides direct evidence of whether a security trades in an efficient market.  **(Section V.)**

- *Mr. Steinholt's analysis of the 19 financial release dates is not sufficient to demonstrate a cause-and-effect relationship between new, material information and SQM's ADS price during the Proposed Class Period.*  Mr. Steinholt tested whether SQM's ADS price reaction was statistically significant on 19 financial release dates and identified a statistically significant abnormal return on only five of the 19 dates.  Mr. Steinholt's opinion that this finding is evidence the ADS traded in an efficient market is the result of a flawed and biased test.

---

[14]   Steinholt Report, ¶¶ 7-8.

[15]   Steinholt Report, ¶ 53.

[16]   Steinholt Report, ¶ 53.

Mr. Steinholt selected the 19 dates not randomly, but precisely because they likely contained new and material information. He then tests whether enough of these 19 dates have statistically significant abnormal returns so that random chance alone could not explain the result. In setting the bar so low, he ignores the possibility that in an efficient market, many, if not most, of these financial release dates would be expected to have an abnormal return, and the fact that so few do would be evidence that is inconsistent with his conclusion. **(Section V.B.)**

- *My analysis of SQM's ADS price reaction to qualitative news of the type at issue in this case does not support the conclusion that SQM's ADS efficiently incorporated this type of new and material information.* The alleged misrepresentations in this matter, unlike the quantitative information disclosed on financial release dates, are qualitative in nature. Therefore, assessing whether SQM's ADS price quickly impounded new, material qualitative information is more relevant to whether the information alleged to have "inflated" SQM's ADS price was in fact impounded into that price. I identified a set of 31 dates on which SQM filed non-financial Form 6-Ks with the SEC. Based on Mr. Steinholt's own model, SQM's ADS price reaction was statistically significant on only two of these 31 dates, one of which was the last day of the Proposed Class Period. This result does not clear Mr. Steinholt's own threshold for statistical significance. **(Section V.C.)**

- *Irrespective of the flaws with Mr. Steinholt's analysis of the 19 financial release dates, Mr. Steinholt does not demonstrate that his conclusions apply to the entirety of the nearly five-year-long Proposed Class Period.* Mr. Steinholt tested only 19 financial release dates during a 1,187 day Proposed Class Period. Moreover, he identified *no* statistically significant abnormal returns related to any financial release until 14 months after the start of the Proposed Class Period. Even when this time period is extended by another year to 26 months, as suggested by Mr. Steinholt at his deposition, only one of the nine financial release dates exhibited a statistically significant return, which does not clear Mr. Steinholt's own threshold for statistical significance. Thus, for the first 26 months (or approximately half) of the Proposed Class Period, Mr. Steinholt has not demonstrated the existence of a cause-and-effect relationship, even using his flawed approach. **(Section V.D.)**

- *Once Mr. Steinholt's results have been corrected to account for the risk of false positives, Mr. Steinholt's own methodology does not support a strong conclusion of market efficiency.* Mr. Steinholt's financial release dates test suffers from what statisticians refer to as the "problem of multiple comparisons," which increases the risk of false positives or incorrectly identifying a statistically significant result when none is present. After the multiple comparisons problem is corrected using widely accepted statistical techniques, his model shows that only three of the 19 financial release dates were associated with statistically significant abnormal returns. Mr. Steinholt testified in his deposition that such a finding would lead him to conclude, at best, that there is only "some evidence" at the 10 percent

7

significance level that new and material information is quickly incorporated into the share price, rather than "strong evidence." **(Section V.E.)**

- *Mr. Steinholt's analysis of SQM's ADS price reaction on March 18, 2015 does not reliably establish a cause-and-effect relationship between news and SQM's ADS price.* Mr. Steinholt tested SQM's ADS price reaction to the alleged corrective disclosure on the last day of the Proposed Class Period, when SQM's ADS price declined approximately 15 percent. Among other flaws, Mr. Steinholt introduced bias by selecting a date that he knew ex ante was associated with a highly significant movement in the ADS price. Also there is no objective economic basis for Mr. Steinholt to have tested this particular date but not, for example, the other alleged corrective disclosure dates. In fact, SQM's ADS price did not exhibit a statistically significant return on the other alleged corrective disclosure dates based on Mr. Steinholt's own model. **(Section V.F.)**

16.    I further conclude that there is evidence that SQM's ADS traded in an inefficient market during the Proposed Class Period. The following is a summary of my opinions in reaching this conclusion:

- *SQM's ADS exhibited serial correlation during the Proposed Class Period, which is evidence that SQM's ADS traded in an inefficient market during the Proposed Class Period.* The presence of serial correlation means an investor could use prior stock returns to develop a profitable trading strategy, indicating the market does not exhibit weak-form efficiency. Based on commonly employed tests for serial correlation, I find serial correlation in SQM's ADS prices during the Proposed Class Period. **(Section VI.)**

17.    In the sections that follow, I first address Mr. Steinholt's assessment of the indirect *Cammer* and *Krogman* factors by describing academic studies that highlight the limitations of these indirect indicators of market efficiency. I then assess Mr. Steinholt's analysis of the fifth, direct *Cammer* factor and explain why his analysis is insufficient to demonstrate a cause-and-effect relationship between news and SQM's ADS price. Lastly, I describe the serial correlation tests that I employed and show that SQM's ADS do not pass tests for weak-form efficiency commonly used in the academic literature, indicating that the shares did not trade in an efficient market.

**IV.    EVALUATION OF THE INDIRECT *CAMMER* AND *KROGMAN* FACTORS IS INSUFFICIENT TO ESTABLISH MARKET EFFICIENCY**

18.    Mr. Steinholt asserts that the indirect *Cammer* and *Krogman* factors are "commonly viewed to be sufficient to establish market efficiency."[17]  I disagree.  In my opinion, from an economic perspective, the indirect factors are insufficient to establish market efficiency.  Several academic studies, which I discuss below, support my opinion.  These studies show that there are many instances where securities that fulfill the first four *Cammer* factors and the three *Krogman* factors (that is, the indirect tests) still trade in inefficient markets.  The academic literature, including the articles cited by Mr. Steinholt, are not supportive of Mr. Steinholt's position that the indirect factors provide sufficient evidence of market efficiency.

19.    For example, Mr. Steinholt cites an article written by Barber, et al. [18]  The authors of this paper acknowledge that they "know of no systematic body of evidence showing that [the *Cammer* and *Krogman* factors] or any other criteria distinguish between efficient and inefficient stocks."[19]  The authors further conclude that "several presumed efficiency indicators that were used by courts, the number of market makers, in particular, failed in our tests to discriminate between efficiently and inefficiently priced securities."[20]

---

17    Steinholt Report, ¶ 17.

18    Steinholt Report, nn. 21, 24, 33.

19    Brad M. Barber, et al., "The Fraud-on-the-Market Theory and the Indicators of Common Stocks' Efficiency," *Journal of Corporation Law* 19, 1994, p. 290.

20    Brad M. Barber, et al., "The Fraud-on-the-Market Theory and the Indicators of Common Stocks' Efficiency," *Journal of Corporation Law* 19, 1994, p. 286.

20.     Another study by Erenburg, et al. (2011) tested three of the indirect *Cammer* factors and

two of the *Krogman* factors[21] while assessing whether the market for stocks meeting

these factors exhibited weak-form efficiency.[22]  The authors found "the *Cammer* and

*Krogman* factors that [they] examine exhibit little relation to weak-form market

efficiency."[23]  For example, the authors concluded that "[t]he evidence does not support

the blanket presumption of market efficiency for NYSE-listed firms."[24]  Similarly, the

authors found that the number of analysts covering a stock "is essentially neutral, rather

than implying market efficiency."[25]  And, yet again, with respect to the *Cammer* factor

related to share turnover (that is, trading volume), the authors found that "the net

relationship [between turnover and weak-form efficiency] is in the opposite direction of

the *Cammer* court's intuition."[26]  That is, "on net, inefficient pricing induces more

trading" rather than less.[27]

---

[21]   The indirect *Cammer* factor not tested by Erenburg et al. is the fourth *Cammer* factor (whether the firm is eligible to file an S-3 registration statement).  Erenburg et al. did not test the third *Krogman* factor (or the percentage of stock held by insiders).  Grigori Erenburg, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of Market Prices?", *Journal of Empirical Legal Studies*, Vol. 8, Issue 2, 2011, n. 31.

[22]   Erenburg, et al. tested for weak-form efficiency by evaluating whether the markets exhibited serial correlation. Grigori Erenburg, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of Market Prices?", *Journal of Empirical Legal Studies*, Vol. 8, Issue 2, 2011, pp. 286-292.  I describe serial correlation in greater detail in **Section VI.**

[23]   Grigori Erenburg, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of Market Prices?", *Journal of Empirical Legal Studies*, Vol. 8, Issue 2, 2011, p. 292.

[24]   Grigori Erenburg, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of Market Prices?", *Journal of Empirical Legal Studies*, Vol. 8, Issue 2, 2011, p. 289.

[25]   Grigori Erenburg, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of Market Prices?", *Journal of Empirical Legal Studies*, Vol. 8, Issue 2, 2011, p. 290.

[26]   Grigori Erenburg, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of Market Prices?", *Journal of Empirical Legal Studies*, Vol. 8, Issue 2, 2011, p. 291.

[27]   Grigori Erenburg, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of Market Prices?", *Journal of Empirical Legal Studies*, Vol. 8, Issue 2, 2011, p. 291.

21.     Erenburg, et al. reached similar conclusions regarding the *Krogman* factors.  For

example, with respect to evaluating market efficiency based on a firm's market

capitalization, the authors found that "high-market-cap firms have more positive serial

correlation than other firms."[28]  As I describe in more detail below, positive serial

correlation indicates market *inefficiency*.  Finally, with respect to the *Krogman* court's

conclusion that efficient stocks will exhibit a narrower bid-ask spread, Erenburg, et al.

find instead that "profitable momentum trading (economically significant weak-form

inefficiencies) is more likely for firms with narrower percentage spreads."[29]  In summary,

the Erenburg, et al. paper demonstrates that the indirect factors are inadequate to reach

conclusions regarding market efficiency.

22.     Several other academic studies highlight cases where a company's stock "passes" the

tests associated with most, and in some cases, all of the *Cammer* factors, and yet trades in

an inefficient market.  Some of these examples highlight instances where apparent

arbitrage opportunities persisted for extended periods.[30]  For example, Lamont and Thaler

(2003a) and Fedenia and Hirschey (2009) identified examples in which two classes of

shares, with known relative claims on the underlying company's cash flows, nevertheless

---

[28]   Grigori Erenburg, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of
      Market Prices?", *Journal of Empirical Legal Studies*, Vol. 8, Issue 2, 2011, p. 291.

[29]   Grigori Erenburg, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of
      Market Prices?", *Journal of Empirical Legal Studies*, Vol. 8, Issue 2, 2011, p. 292.

[30]   *Cammer* recognized the importance of arbitrageurs: "The existence of market makers and arbitrageurs would
      ensure completion of the market mechanism; these individuals would react swiftly to company news and
      reported financial results by buying or selling stock and driving it to a changed price level." *Cammer v. Bloom*,
      711 F. Supp. 1264, 1286-87 (D.N.J. 1989).  However, the mere existence of arbitrageurs in a market does not
      ensure that the market is efficient.  In other words, there may be limits to arbitrage.  *See*, *e.g.*, Andrei Shleifer
      and Robert W. Vishny, "The Limits of Arbitrage," *The Journal of Finance*, Vol. 52, No. 1, March 1997, pp. 35-
      55.

traded at prices that were inconsistent with those relative claims.[31]  Another study by

Lamont and Thaler (2003b) identified five examples of spinoff initial public offerings

where the spinoff's post-offering price was so high for at least a two-month period that

the implied standalone value of the parent company that retained a large ownership share

in the spinoff was negative.[32]

23.     Still other studies have researched pricing anomalies for stocks that meet many of the

*Cammer* and *Krogman* factors.  These pricing anomalies include the reaction of stocks to

news already known to the market, indicating a lack of semi-strong form efficiency.  For

example, the stock of a biotech firm generated a 330 percent return after a *New York

Times* article mentioned a research breakthrough, even though various news outlets,

including the *New York Times* itself, published that same news several months before.[33]

Another study found that the markets for a large cross section of stocks experienced

reactions to stale news.[34]  In a market exhibiting semi-strong form efficiency, prices

should already incorporate stale news by the time the repeated "news" is released,

---

[31]   Owen Lamont and Richard Thaler, "The Law of One Price in Financial Markets," *Journal of Economic Perspectives* 17, 2003, pp. 191-202; Mark Fedenia and Mark Hirschey, "The Chipotle Paradox," *Journal of Applied Finance*, Vol. 19, 2009, p. 146.  A later paper by Bajaj, et al. (2014) confirmed that the stocks analyzed in these papers fulfilled the Cammer factors.  *See* Mukesh Bajaj et al., "Assessing Market Efficiency for Reliance on the Fraud-on-the-Market Doctrine after *Wal-Mart* and *Amgen*," *Research in Law and Economics*, Vol. 26, 2014, pp. 185-187.

[32]   Owen Lamont and Richard Thaler, "Can the Market Add and Subtract? Mispricing in Tech Stock Carve-Outs," *Journal of Political Economy* 111, 2003, pp. 233, 235.  Bajaj, et al. (2014) confirmed that these stocks fulfilled the Cammer factors as well.  *See* Mukesh Bajaj et al., "Assessing Market Efficiency for Reliance on the Fraud-on-the-Market Doctrine after *Wal-Mart* and *Amgen*," *Research in Law and Economics*, Vol. 26, 2014, pp. 185-187.

[33]   Gur Huberman and Tomer Regev, "Contagious Speculation and a Cure for Cancer: A Nonevent that Made Stock Prices Soar," *The Journal of Finance*, Vol. 56, No. 1, February 2001, pp. 391-392.

[34]   Paul C. Tetlock, "All the News That's Fit to Reprint: Do Investors React to Stale Information?", *The Review of Financial Studies*, Vol. 24, No. 5, 2011, pp. 1481-1512.

implying that there should not be a significant abnormal return (in contrast to the reaction observed by these studies).

24.     Mr. Steinholt was asked in his deposition about some of the above examples and stated his belief that they related not to informational efficiency, but rather "whether or not investors value the information… [I]t's not that information is not reflected in the stock price, it is whether or not investors correctly interpret and analyze the information."[35] However, the examples above are not instances where the value of the relevant information was uncertain.  These examples pertain to instances where either (1) the relative claims of two securities on the company's cash flows, which could be calculated with certainty, were not accurately reflected in the securities' prices, indicating that, even if arbitrage opportunities exist, the presence of financial frictions, such as transaction costs or short-sale constraints, implies that arbitrage does not always eliminate pricing inefficiencies (that is, there are "limits to arbitrage"); or (2) the market reacted to stale information, indicating that it was not semi-strong efficient.  In my view, these studies cast serious doubt on Mr. Steinholt's statement that the indirect factors are sufficient, by themselves, to establish market efficiency.

## V.     MR. STEINHOLT'S ANALYSIS OF THE FIFTH CAMMER FACTOR IS FLAWED AND FAILS TO RELIABLY DEMONSTRATE MARKET EFFICIENCY

25.     The fifth *Cammer* factor is of critical importance given the insufficiency of the four indirect *Cammer* factors in demonstrating market efficiency.  In my opinion, and consistent with the academic literature described above, the fifth *Cammer* factor is the

---

[35]     Steinholt Deposition, pp. 139-141.

13

only *Cammer* factor that provides direct evidence of whether a security trades in an efficient market.  Therefore, in this section, I assess Mr. Steinholt's evaluation of the fifth *Cammer* factor and provide the basis for my conclusion that Mr. Steinholt failed to establish direct evidence of a cause-and-effect relationship between company-specific news and SQM's ADS price.  As described above, Mr. Steinholt conducts two sets of analyses to evaluate the fifth *Cammer* factor: (1) the ADS price reaction to SQM's 19 financial releases during the Proposed Class Period,[36] and (2) the ADS price reaction following the alleged corrective disclosure on March 18, 2015.[37]  I discuss both analyses below.

**A.      Overview of Mr. Steinholt's Analysis of Financial Release Dates**

26.      Mr. Steinholt analyzed SQM's ADS price reaction on the 19 dates during the Proposed Class Period on which SQM released its financial results to assess whether SQM's ADS price incorporated new and material information during the Proposed Class Period.[38]  More specifically, Mr. Steinholt performed a regression analysis, hereafter referred to as an "event study," to infer the stock price reaction on a specific date (or event).  On a given day, a wide range of information may affect a publicly traded security's price.  Such information includes, for example, market- and/or industry-specific factors, as well as company-specific news.  Financial economists use event studies in an effort to isolate the part of the daily stock return that is attributable to market and industry factors.  The remainder is referred to as the "abnormal" return.

---

[36]      Steinholt Report, ¶ 40.

[37]      Steinholt Report, ¶¶ 41-45.

[38]      *See, e.g.,* Steinholt Report, ¶ 37.

27.      After controlling for market and industry factors, Mr. Steinholt found that five of the 19

SQM financial release dates are associated with statistically significant abnormal SQM

ADS returns.[39]  He calculates that the "cumulative probability of five or more days out of

nineteen being statistically significant at the 5% level simply by chance is significantly

less than 1%."[40]  Mr. Steinholt concluded that, "[c]onsequently, the statistical evidence is

strong that new and material Company-specific information was quickly incorporated

into SQM's ADS price."[41]  In his deposition, Mr. Steinholt clarified that his conclusion

that the evidence is "strong" is based on the fact that the cumulative probability he

calculates is below one percent.[42]

28.      However, as described below, Mr. Steinholt conducted a flawed evaluation of the fifth

*Cammer* factor that does not provide a reliable basis for his conclusion that the market for

SQM's ADS was efficient throughout the Class Period.

**B.      Mr. Steinholt Failed to Develop a Hypothesis About Whether the Dates He Tested Should Cause a Statistically Significant Abnormal Return**

29.      Mr. Steinholt's analysis of the 19 financial release dates is not sufficient to demonstrate a

cause-and-effect relationship between new, material information and SQM's ADS price

during the Proposed Class Period.  Mr. Steinholt chose to test the share price reaction on

the 19 financial release dates on the theory that "[f]inancial releases generally provide

new information to investors, and therefore they have a greater likelihood of materially

---

[39]    Steinholt Report, ¶ 40.  Mr. Steinholt defines abnormal returns as "the stock's return on the event day net of market and industry factors." Steinholt Report, ¶ 37.

[40]    Steinholt Report, ¶ 40.

[41]    Steinholt Report, ¶ 40.

[42]    Steinholt Deposition, p. 278.

altering the public mix of information."[43]  That is, Mr. Steinholt recognizes that

companies generally disclose more value-relevant information on financial release dates.

Despite this deliberate process for choosing the 19 dates, Mr. Steinholt's test of a cause-

and-effect relationship is whether random chance alone can account for the number of

statistically significant dates observed.  If it cannot, then Mr. Steinholt concludes SQM's

ADS exhibited a cause-and-effect relationship with new and material information.

However, this approach is not a reliable test of whether the market for SQM's ADS was

efficient during the entire Proposed Class Period, and Mr. Steinholt provides no support

for his methodology.

30.     To begin, Mr. Steinholt recognizes that SQM's ADS price may exhibit a statistically

significant abnormal return on some dates due to random noise – that is, something other

than new and material information causes the statistical significance.  This outcome is

what statisticians refer to as a false positive, or Type I error.  In Mr. Steinholt's analysis,

such false positives can occur with a probability of five percent on any given day.  Mr.

Steinholt's test of market efficiency asks whether, given this underlying probability of a

false positive, can random chance alone explain a finding of five of 19 dates being

statistically significant?  The test is thus focused on disproving randomness, not proving a

cause-and-effect relationship.  As I describe below, this flaw undermines Mr. Steinholt's

conclusion.

31.     In statistical terms, to establish a cause-and-effect relationship, Mr. Steinholt seeks

evidence against the null hypothesis that the observed significant abnormal returns are

---

[43]     Steinholt Report, ¶ 40.

simply all false positives.[44]  The more dates of significant abnormal returns that Mr.

Steinholt observes, the stronger the evidence against this null hypothesis.  Mr. Steinholt

claims that rejecting this null hypothesis allows him to conclude that SQM's ADS price

exhibited a cause-and-effect relationship with new and material information.  It follows,

therefore, that the more financial release dates with statistically significant returns, the

more likely the presence of a cause-and-effect relationship.

32.    How many days of significant abnormal returns does Mr. Steinholt need to observe

before he can conclude that the market for SQM's ADS is efficient?  As Mr. Steinholt

clarified in his deposition, his methodology is to calculate the cumulative probability of

finding at least a certain number of dates with statistically significant abnormal returns,

and, if that probability is less than 10 percent, he can conclude that there is "some

evidence" that the price quickly incorporates new and material information.[45]  Mr.

Steinholt also explained in his deposition that a probability below five percent would

allow him to conclude that there is "evidence" (but not "strong evidence"), and a

probability below one percent would allow him to conclude that there is "strong

evidence."  Mr. Steinholt testified that a probability greater than 10 percent would

indicate there was no evidence that the share price quickly incorporated new and material

information.[46]  Put differently, in the context of his testing of the 19 financial release

dates in this matter, a finding of two or fewer statistically significant dates would be

deemed no evidence that the price quickly incorporates new and material information;

---

[44]    In hypothesis testing, a null hypothesis is a statement that the statistician assumes, as a starting point, to be true. The statistician then tests whether the null hypothesis is likely to be false.

[45]    Steinholt Deposition, pp. 278-282.

[46]    Steinholt Deposition, pp. 278-282.

three dates would be considered "some evidence"; four dates would be "evidence"; and

five or more dates would be "strong evidence."  In the end, Mr. Steinholt finds five

financial release dates to have statistically significant abnormal returns, which is the

minimum number required to meet his conclusion of "strong evidence" of market

efficiency.

33.     A shortcoming of Mr. Steinholt's approach is that it ignores the fact that Mr. Steinholt

selected these 19 dates *precisely* because he believes that the disclosures on these dates

"have a greater likelihood of materially altering the public mix of information."[47]

Because these dates are likely associated with the release of material news, one might

expect to observe a statistically significant abnormal return on many, perhaps even most,

of the dates.  But, under his methodology, Mr. Steinholt needed only to observe a very

small number of dates with statistically significant abnormal returns among the 19

financial release dates to conclude that the market for SQM's ADS is efficient.  Mr.

Steinholt does not cite any academic article published in a peer-reviewed journal, nor am

I aware of any such article, that would justify why showing that statistically significant

abnormal returns were unlikely to occur randomly on five dates out of 19 is evidence of a

cause-and-effect relationship between material news and SQM's ADS price.

34.     Simply put, Mr. Steinholt's test for market efficiency only shows that there is a low

probability that the statistically significant abnormal returns he observes on five dates are

due to random chance.  But his methodology tells us nothing about whether a finding of

five dates with statistically significant abnormal returns, out of a total of 19 total financial

---

[47]     Steinholt Report, ¶ 40.

release dates, demonstrates a consistent cause-and-effect relationship between material

news and an immediate response in SQM's ADS price.  Further, Mr. Steinholt does not

investigate the implications for market efficiency of *not* observing statistically significant

abnormal returns on the majority of the 19 financial release dates.  For example, if *all* 19

dates included news that "materially altered the public mix of information," then one

would expect *each* of the 19 dates to show a statistically significant abnormal return if the

market were efficient.  In such a scenario, the fact that only five dates have a statistically

significant abnormal return would be inconsistent with the conclusion that the market for

SQM's ADS was efficient.  While I am not opining on whether all 19 financial release

dates actually included material news, the key point is that Mr. Steinholt does not actually

test whether SQM's ADS price responded to the information released on these 19 dates.

Instead, as described, he simply tests whether random chance can account for SQM's

ADS significant price returns on five out of 19 dates.

35.     Mr. Steinholt's failure to evaluate whether SQM disclosed new and unexpected

information on these 19 dates also means that he is unable to explain why 14 of the 19

financial release dates did *not* exhibit a statistically significant abnormal return.  In his

report, Mr. Steinholt notes that "just because the Company announced earnings does not

mean that one would necessarily expect there to be a statistically significant price

increase or decrease because the totality of information disclosed could still be

interpreted by the market as being neutral."[48]  This allows Mr. Steinholt to have it both

ways: if the ADS price reacts, it is evidence that there is a cause-and-effect relationship;

if the ADS price does not react, then the information must have not been new and

_____

[48]     Steinholt Report, n. 44.

unexpected (even though he has undertaken no analysis to determine whether it was or not).  A basic premise of statistical testing, and indeed of the scientific method, is that the null hypothesis being tested must be falsifiable.  But Mr. Steinholt's approach does not meet this basic criterion.  Indeed, to say that the market was efficient because the market's view is always right is purely tautological—it assumes what Mr. Steinholt sets out to prove.

36.   At his deposition, Mr. Steinholt posited that one reason he may not have observed statistically significant abnormal returns on the majority of his tested financial release dates is that:

> when you have a company that is basically having a commodity product where a lot of the value on [sic] the company is dependent on commodity prices and other factors, the earnings revealed on earnings days may not be as unexpected as for other companies where investors may be more in the dark with respect to what is ultimately disclosed on earnings release days.[49]

37.   However, there are, in fact, indications that the prices for commodities sold by SQM are not widely available to the market.  For example, one of SQM's major business segments relates to its production of iodine.[50]  But even after searching Bloomberg and other common sources of financial information, I was unable to identify any publicly available source for daily iodine prices.  My difficulty in identifying these prices is consistent with analyst commentary regarding SQM.  For example, a J.P. Morgan analyst report that Mr. Steinholt reviewed,[51] noted the "[o]paqueness of markets" as a "concer[n] related to

---

[49]   Steinholt Deposition, pp. 286-287.

[50]   Socieded Química y Minera de Chile S.A., Form 20-F for the fiscal year ending December 31, 2013, pp. 20-22.

[51]   Steinholt Report, Exhibit B.

investors' ability to obtain sufficient information on the company in order to make investment decisions."[52]  J.P. Morgan stated,

> Given the small size and niche focus of some of SQM's markets (specifically specialty plant nutrients, lithium, iodine, and industrial nitrates), up-to-date information on pricing dynamics and consumption trends is difficult to come by, which makes forecasting more challenging.[53]

38.   Additionally, there was a recent article in the *Wall Street Journal* specifically focused on the opaqueness of lithium pricing, another significant market for SQM.[54]  Therefore, contrary to Mr. Steinholt's theory, the opaqueness of the markets for many of SQM's commodities instead suggests that the earnings for a company like SQM would not be as easy to predict as he posited in his deposition.

39.   Suppose, in the alternative, the correctness of Mr. Steinholt's apparent theory that commodity prices frequently enabled investors to accurately predict SQM's earnings was correct, such that "surprises" on the financial release dates were unlikely.  Such a finding would further impugn Mr. Steinholt's evaluation of the causal relationship between new and material information and changes in SQM's ADS price during the Proposed Class Period.  It would suggest that the 19 financial releases did not in fact constitute new disclosures, or at a minimum that they did not have a "greater likelihood" of altering the total mix of information.  Under this alternative, the fact that SQM's ADS experienced a statistically significant abnormal return on five of the 19 financial release dates could be

---

52   J.P. Morgan, "Room to Run as Fundamentals Improve, Upgrade to OW," November 28, 2010, TW0010409-420, at 416.

53   J.P. Morgan, "Room to Run as Fundamentals Improve, Upgrade to OW," November 28, 2010, TW0010409-420, at 416.

54   Scott Patterson, "Lithium Boom Raises Question: What Is Its Price?," *Wall Street Journal*, November 27, 2018, available at: https://www.wsj.com/articles/lithium-boom-raises-question-what-is-its-price-1543323600; Socieded Química y Minera de Chile S.A., Form 20-F for the fiscal year ending December 31, 2013, pp. 20-22.

an indication of an *inefficient* market because SQM's ADS price moved in response to no new information. Therefore, either Mr. Steinholt tested 19 dates with new and material information and found a cause-and-effect relationship on only five, or 26 percent of the dates, or there was not new and material information released on some or all of his 19 dates, further weakening the very basis of his test or even providing evidence of market inefficiency.[55]

40.     Lastly, as further evidence that Mr. Steinholt's test is not reliable for assessing market efficiency, suppose that the information released on the 19 dates was not new and material and that SQM's ADS price did not experience a statistically significant change on these dates. Such non-reaction in the ADS price is what one would expect in an efficient market (that is, the price not responding to old or immaterial information). Mr. Steinholt's test, however, would nonetheless lead him to conclude that the market for SQM's ADS is not efficient because he would identify fewer than the five dates his test requires for a finding of "strong evidence." This only underscores the disconnect between Mr. Steinholt's test and actual evidence of market efficiency.

41.     Even assuming that SQM disclosed new information on these 19 dates, as I describe in the next section, Mr. Steinholt failed to test the market's reaction on the numerous other dates during the Proposed Class Period when the market learned of SQM-specific information.

---

[55]   I discuss further below that Mr. Steinholt's examination of only 19 dates was insufficient to evaluate whether the market for SQM's ADS was efficient during the entire 1,187-day Proposed Class Period. To the extent that the disclosures on some or all of the 19 dates he tested did not contain new and unexpected material information, such that his sample set was even smaller than it appears, then his analysis is even less able to demonstrate market efficiency during the entire Proposed Class Period.

**C.** **Mr. Steinholt Has Not Shown That the Market Efficiently Impounded the Type of Information at Issue in This Matter**

42.    Mr. Steinholt performed no analysis of whether SQM's ADS price quickly incorporated

the information contained in the more than 2,900 Lexis/Nexis and Bloomberg media

reports from 2010 to 2015 upon which he purportedly relied.[56]  Nor did Mr. Steinholt

conduct any analysis of whether SQM's ADS price quickly incorporated new information

in SQM's many other SEC filings beyond the financial releases, upon which Mr.

Steinholt also apparently relied.[57]  Moreover, *even if* SQM's ADS price quickly

incorporated certain types of new, material information, one cannot automatically

conclude that the market efficiently impounded the type of information that is at issue in

this matter.

43.    In my opinion, from an economic perspective, market efficiency for a particular stock

may differ depending on the type of information released.  The 19 financial release dates

tested by Mr. Steinholt generally contained numeric or financial information that markets

typically incorporate readily.  For example, market participants regularly compare

reported revenues and earnings to analysts' estimates to assess whether a company met,

exceeded, or underperformed expectations.[58]  As Mr. Steinholt acknowledged, stock

---

[56]    Steinholt Report, ¶ 26.  Despite not analyzing the stock price reaction to these news items, Mr. Steinholt did form an opinion as to which news was "important." In his deposition, Mr. Steinholt testified that "if [he] would read something and find it important, [he] would print it out and it would be produced to [the defendant]." Steinholt Deposition, pp. 213-214.

[57]    Steinholt Report, Exhibit B.

[58]    As one example, an August 28, 2013 Morgan Stanley report reviewed by Mr. Steinholt identified that the EBITDA reported in the August 2013 financial release "was 25% below consensus with EPS 22% below." Mr. Steinholt did not observe a statistically significant abnormal return on this date.  Morgan Stanley, "Weak Q2; Outlook too Uncertain to Turn Positive," August 28, 2013, TW0009414-420 at 414; Steinholt Report, Exhibits B and E.

prices reflect the market's estimate of the present value of future cash flows.[59]  Therefore, it is not surprising that the market is more readily able to incorporate numeric financial information, which typically has a clear relationship to the estimated future cash flows. Moreover, the investment community generally knows ahead of time when a company will release its earnings, likely attracting increased attention from analysts and investors on earnings-release dates and thereby facilitating the dissemination of earnings-related information.[60]  Indeed, the majority of the analyst reports that Mr. Steinholt reviewed were published within three days of a financial release.[61]

44.   My opinion is consistent with the academic literature.  For example, an article by Barber, et al., which Mr. Steinholt also cites,[62] states that, "[e]ven for a given security and time period, efficiency might vary across different information items."[63]  The article continues, "while the market can be efficient with respect to a widely-used and regularly reported item, such as earnings, it can be inefficient (react slowly to the release of information) with respect to an infrequent, difficult to interpret item, such as the announcement of a new business alliance."[64]

---

[59]   Steinholt Deposition, pp. 80, 240.

[60]   For example, Bloomberg and Morningstar, among other companies, maintain calendars showing upcoming financial releases and conference calls.  *See, e.g.,* Bloomberg, Earnings Calendar, available at: https://www.bloomberg.com/markets/earnings-calendar/us; Morningstar, Earnings Calendar, available at: http://www.morningstar.com/earnings/earnings-calendar.aspx.  SQM also provides a similar calendar identifying upcoming events such as the publication of financial results.  *See* SQM, Calendar, available at: http://ir.sqm.com/English/investor-relation/ir-calendar/default.aspx?ShowEvents=FUTURE.

[61]   Steinholt Report, Exhibit B.

[62]   Steinholt Report, nn. 21, 24, 33.

[63]   Brad M. Barber, et al., "The Fraud-on-the-Market Theory and the Indicators of Common Stocks' Efficiency," *Journal of Corporation Law* 19, 1994, p. 290.

[64]   Brad M. Barber, et al., "The Fraud-on-the-Market Theory and the Indicators of Common Stocks' Efficiency," *Journal of Corporation Law* 19, 1994, pp. 290-291.

45.     In contrast to the information contained in the financial releases, the alleged

misstatements in this matter generally involve non-numeric and non-financial

information.  In particular, Plaintiffs allege that SQM misrepresented "its compliance

with the laws and regulations governing its operations" and the "sufficiency of its internal

controls."[65]  Similarly, the alleged corrective disclosures, which were not on pre-

scheduled dates, also generally involved non-numeric and non-financial information.  For

example, one of the alleged corrective disclosures is a February 26, 2015 press release

regarding "an extraordinary [SQM] Board meeting" and the formation of an ad hoc

committee to oversee an internal investigation.[66]  The market could not have known the

results of such an extraordinary Board meeting prior to the meeting, which means that

that the release was new and unexpected information to the market.  In other words,

unlike the scheduled financial release events that Mr. Steinholt analyzed, the events at

issue in this matter involve the disclosure of qualitative information on unscheduled

dates.

46.     To address this issue, I conducted an analysis to assess whether the market for SQM's

ADS efficiently incorporated the type of non-numeric, unscheduled, information at issue

in this matter.  Specifically, I tested SQM's ADS price reaction to SQM's non-financial

Form 6-K filings to assess whether the ADS price reacted to unexpected and non-

financial SQM news.  To conduct this test, I first identified an appropriate universe of

dates to test.  During the Proposed Class Period, SQM filed 85 Forms 6-K, which were

---

[65]   *Megan Villella, et al.  v. Chemical and Mining Company of Chile Inc., et al.*, Corrected Consolidated Complaint
      for Violation of the Securities Laws, February 9, 2016 ("Amended Complaint"), ¶ 80.

[66]   Amended Complaint, ¶ 205.

associated with 78 trading dates.[67]  I excluded from these 78 dates the 19 financial release

dates that Mr. Steinholt tested, given that I sought to evaluate the price reaction to non-

financial news.

47.     I then reviewed the content of the Form 6-K filings that were released on the 59

remaining trading dates (that is, the 78 total Form 6-K dates minus the 19 financial

release dates) to assess whether the information was in fact new—*i.e.*, had not been

previously released to the market.  Based on this review, I excluded the following types

of Form 6-K filings as containing previously released news:

> 1)  Financial releases previously filed with the Chilean SVS or financial
>      results previously released;
>
> 2)  Summaries of earnings calls that occurred during market hours on the
>      prior trading day; and
>
> 3)  Summaries of agreements reached at shareholders' meetings, as
>      shareholders that attended the meetings would have already known the
>      content discussed by the time SQM filed the Form 6-K.[68]

48.     Implementing the above content screen leaves 31 unique trading dates on which SQM

filed a Form 6-K containing new but non-financial information (see **Exhibit 1**).  I then

used Mr. Steinholt's regression results to determine whether SQM's ADS price reaction

was statistically significant on these 31 dates, according to Mr. Steinholt's model.  For

these 31 dates, Mr. Steinholt's own event study indicates that two dates were associated

with statistically significant abnormal returns.[69]

---

[67]   SEC EDGAR, Filings for Chemical & Mining Co. of Chile, Inc., available at: https://www.sec.gov/cgi-bin/browse-edgar?action=getcompany&CIK=0000909037&owner=exclude&count=40.

[68]   Note that none of the 28 dates I remove with these three rules exhibit statistically significant abnormal returns. *See* Steinholt Report, Exhibit E.

[69]   Steinholt Report, Exhibit E.

49.     If I adopt Mr. Steinholt's methodology for purposes of this example, the cumulative

probability of two or more of the 31 dates being statistically significant by chance is 46.3

percent, well above the 10 percent level at which, in his deposition, Mr. Steinholt

indicated he would need to be below to reject the hypothesis that such a finding occurred

due to random chance.[70]

### D.     Mr. Steinholt Has Not Demonstrated That His Conclusion Applies to the Entirety of the Proposed Class Period

50.     Even if one were to accept Mr. Steinholt's argument, discussed above, that finding

statistically significant abnormal returns on five out of the 19 financial release dates

constitutes "strong evidence" of market efficiency, Mr. Steinholt still has not

demonstrated that this finding applies to the entirety of the 1,187-day Proposed Class

Period.  First, Mr. Steinholt chose to test only 19 dates (or approximately 1.6 percent of

the Proposed Class Period).  Based on the results for these 19 dates, for which he finds a

cause-and-effect relationship on five, Mr. Steinholt concluded that the market for SQM's

ADS was efficient during the entire Proposed Class Period.  This is an exceedingly small

number of dates to test given the length of the Proposed Class Period.

51.     Second, the efficiency of the market for a common stock or ADS may vary over time.  As

Mr. Steinholt admitted in his deposition, it is possible for a stock to transition "from an

efficiently traded stock to an inefficiently traded stock."[71]  Indeed, ignoring for the sake

of argument the flaws with Mr. Steinholt's methodology, Mr. Steinholt found no

---

[70]   Steinholt Deposition, pp. 280-281.  Even if it were to turn out the information on some of these 31 dates was released earlier or was immaterial, such that a given date should be dropped from this analysis, the total number of dates would need to be reduced from 31 to 10 (without removing either of the two dates associated with statistically significant abnormal returns) before the cumulative probability would fall below 10 percent.

[71]   Steinholt Deposition, p. 267.

statistically significant price reaction associated with SQM's first four financial release
dates during the Proposed Class Period. That is, he identified no statistically significant
abnormal return related to a financial release until August 31, 2011, or 14 months after
the start of the Proposed Class Period. As a result, for the first 14 months of the Proposed
Class Period, Mr. Steinholt has identified no evidence of a cause-and-effect relationship,
even using his flawed approach. Importantly, it is not the case that each of these first
four financial release dates lacked "new" information. For example, SQM announced
financial results on September 1, 2010 that exceeded analysts' expectations and analyst
reports commented on the positive earnings surprise.[72]  Mr. Steinholt's model, however,
did not identify a statistically significant return on September 1, 2010 despite the news.[73]

52.     Further, Mr. Steinholt testified that, when faced with shorter class periods in the past, he
has expanded his sample period to two years to have a larger sample.[74]  If I consider the
more than two-year period encompassing the beginning of the Proposed Class Period on
June 30, 2010 through the financial release on August 29, 2012, Mr. Steinholt tested nine
financial release dates (approximately half of the total number that he tested), and finds
only one that demonstrated statistically significant abnormal returns.[75]  Under
Mr. Steinholt's methodology, the cumulative probability of one or more out of nine dates
being statistically significant at the 5 percent level is 37.0 percent. Based on

---

[72]   For example, a September 2, 2010 LarrainVial analyst report noted, "SQM reported results for 2Q10 above our
expectations and those of the market. The quarterly EBITDA reached USD 186 million, 15% above our
projection." TW0010429. Similarly, CelfinCapital noted, "SQM reported 2Q10 profit of US$105.0mn
(US$0.40/ADR), well above our forecast of US$88.0mn (US$0.33/ADR), and also the street's average…"
TW0010439.

[73]   Steinholt Report, Exhibit E.

[74]   Steinholt Deposition, p. 270.

[75]   Steinholt Report, Exhibit E.

Mr. Steinholt's own testimony, such a probability (well above the 10 percent level) would not allow him to conclude that SQM's ADS efficiently incorporated new and material information during this time period.[76]  Mr. Steinholt's results, even when adding an additional year to the first 14 months in which no statistically significant returns are observed on the financial release dates, do not support the existence of a cause-and-effect relationship during at least the first 26 months of the Proposed Class Period.

### E.      Mr. Steinholt's Test Suffers from the Problem of Multiple Comparisons

53.      Mr. Steinholt's analysis of the 19 financial release dates suffers from what statisticians refer to as the problem of "multiple comparisons."  The problem of multiple comparisons means that the more comparisons conducted, the higher the probability of a false positive (*i.e.*, Type I error).  In other words, as one increases the number of statistical tests, it becomes increasingly likely that one will incorrectly find statistically significant results.  Here, Mr. Steinholt tested whether SQM-specific information caused an abnormal change in SQM's ADS price on 19 different dates.  He tested the null hypothesis that SQM's ADS price did not change 19 times (that is, once for each of the 19 financial release dates).

54.      To correct for the problem of multiple comparisons, I used the Holm-Bonferroni method. Holm proposed the Holm-Bonferroni correction in 1979 as a modification to the existing Bonferroni correction for multiple comparisons.[77]  As Mr. Steinholt testified, the Holm-Bonferroni correction is a "very common way[] of adjusting for multiple comparisons."[78]

---

[76]   Steinholt Deposition, p. 281.

[77]   Sture Holm, "A Simple Sequentially Rejective Multiple Test Procedure," *Scandinavian Journal of Statistics* 6 (2), 1979, pp. 65-70.

[78]   Steinholt Deposition, p. 294.

The Holm-Bonferroni correction corrects the significance level necessary to find an event statistically significant.  As described above, in hypothesis testing, a common threshold for statistical significance is the five percent level.  The Holm-Bonferroni correction adjusts this significance level to reflect the number of tests performed.  Such an adjustment reduces the probability of finding a Type I error.[79]  I note that implementing the Holm-Bonferroni correction does not automatically reduce the number of significant dates that one identifies.  The effect of the correction depends on the magnitude of the abnormal returns and the number of hypotheses tested.

55.   After correcting for Mr. Steinholt's multiple comparisons problem, his model results in only three financial release dates associated with statistically significant abnormal returns (see **Exhibit 2A**).[80]  As Mr. Steinholt testified in his deposition, a finding that three of the 19 dates were statistically significant would lead him to conclude only that there is "some evidence" at the 10 percent level that new and material information is quickly incorporated into the share price (as opposed to the "strong evidence" he refers to in his report).[81]

56.   Mr. Steinholt testified at deposition that he believes his test of the 19 financial release dates does not suffer from the problem of multiple comparisons.[82]  Mr. Steinholt is

---

[79]   Sture Holm, "A Simple Sequentially Rejective Multiple Test Procedure," *Scandinavian Journal of Statistics* 6 (2), 1979, pp. 65-70.

[80]   Alternatives to the Holm-Bonferroni correction include the Sidak and Holm-Sidak corrections.  Mr. Steinholt testified that the Sidak correction is the methodology he "typically use[s]," and that he again considers it a "very common way[] of adjusting for multiple comparisons."  Steinholt Deposition, p. 294.  I applied the Sidak and the Holm-Sidak corrections to Mr. Steinholt's model and found that these two corrections yield the same results as the Holm-Bonferroni correction.  That is, only three of the 19 financial release dates exhibited statistically significant abnormal returns.  *See* **Exhibits 2B and 2C**.

[81]   Steinholt Deposition, pp. 280-281.

[82]   Steinholt Deposition, pp. 295-296.

incorrect.  As I discussed above, Mr. Steinholt's analysis is conducting 19 tests to determine whether the stock price reacted to news.  Therefore, despite Mr. Steinholt's objection, it is appropriate to correct for multiple comparisons.

**F.     Mr. Steinholt's Test of the Last Day of the Proposed Class Period Is Methodologically Unsound**

57.     In addition to testing the 19 financial release dates, Mr. Steinholt also tested whether March 18, 2015, exhibited a statistically significant negative return.[83]  On March 18, 2015, SQM announced the resignation of three Board members.[84]  SQM's ADS price declined more than 15 percent from a closing price of $22.10 on March 17, 2015 to $18.65 per share on March 18, 2015.[85]  Mr. Steinholt's analysis of SQM's ADS price reaction on March 18, 2015 is improper for at least four reasons and, in my opinion, does not establish a cause-and-effect relationship between news and SQM's ADS price.

58.     First, the magnitude of SQM's ADS price decline on March 18, 2015 all but guaranteed that Mr. Steinholt would find statistical significance on this date.  Therefore, Mr. Steinholt biased the statistical analysis in his favor by selecting this particular date for testing.  Importantly, it is improper to conduct an event study by first identifying event dates based on the company's share price return.  The widely accepted academic literature on event studies, to which I have contributed, is clear that the first step in properly conducting an event study is to select event(s) of interest, independent of the share price reaction on those dates.[86]

---

[83]   Steinholt Report, ¶¶ 41-45.

[84]   Steinholt Report, ¶ 42.

[85]   Amended Complaint, ¶ 214; Steinholt Report, Exhibit E.

[86]   *See*, *e.g.*, Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature*, Vol. XXXV, March 1997.

59.     Second, and relatedly, there is no objective economic basis for selecting March 18, 2015

         as the only non-financial release date for purposes of evaluating market efficiency.  Mr.

         Steinholt's justification for choosing March 18 is simply that he "always look[s] at the

         last day of the class period."[87]  However, as an economist, I do not view the last day of

         the Proposed Class Period as carrying any more significance for the purposes of

         evaluating market efficiency than the multitude of other news dates throughout the

         Proposed Class Period.

60.     Third, from an economic perspective, the fact that SQM's ADS price reacted to the

         unexpected and significant announcement that three of SQM's eight directors had

         resigned does not demonstrate market efficiency throughout the Proposed Class Period.

         News items of particular importance may move stock prices, but that does not necessarily

         imply that the stock price quickly incorporates new, material information in general over

         a nearly five-year period.  A paper by Cornell and Rutten (2006), cited by Mr. Steinholt,

         similarly states that "even a grossly inefficient market will incorporate to some degree

         news about extremely significant events…"[88]

61.     Lastly, there is no economic justification for Mr. Steinholt's decision to test March 18,

         2015, but not the other five alleged corrective disclosure dates during the Proposed Class

         Period.  As I discussed above, the proper steps in conducting an event study of this type

         are to identify beforehand the dates on which new, material information became public,

---

[87]   Steinholt Deposition, p. 326.  Mr. Steinholt did testify that, "if you didn't have a price decline on the last day of
       the class period, I think that defendants – and I think they would be right to bring that up to the court to point
       out the fact that the last day of the class period did not have a corresponding statistically significant price
       decline," but did not articulate why the return on last day of the class period matters more than returns on other
       alleged corrective disclosure dates.  Steinholt Deposition, pp. 319-320.

[88]   Bradford Cornell and James Rutten, "Market Efficiency, Crashes, and Securities Litigation," *Tulane Law
       Review*, Vol. 81, 2006, p. 457.

and then to test whether there was a statistically significant abnormal return on those dates.  In this case, the first step of this process could include identifying the set of alleged corrective disclosures in the Amended Complaint.  Had Mr. Steinholt tested all of the alleged corrective disclosures, his methodology would show that there were no statistically significant abnormal returns in reaction to the news disclosed on the other five alleged corrective disclosure dates.  I note that although Mr. Steinholt did not explicitly test the five other corrective disclosure dates, his event study results show the finding for all dates in the Proposed Class Period, including the lack of significance on these five alleged corrective disclosure dates.[89]  Using Mr. Steinholt's methodology, the finding that only one of six dates exhibited a statistically significant abnormal return does not support a conclusion that there was a general cause-and-effect relationship between new and material information and movements in SQM's ADS price during the Proposed Class Period.

62.  In summary, Mr. Steinholt's evaluation of the fifth *Cammer* factor is flawed and does not support his conclusion that there is a causal relationship between unexpected news and changes in SQM's ADS prices throughout the Proposed Class Period.  In addition to failing to satisfy the most important *Cammer* factor, as I discuss in the next section, SQM's ADS does not pass the tests for weak-form efficiency commonly used in the academic literature.

---

[89]   Steinholt Report, Exhibit E. *See also* **Exhibit 3**.

## VI.     THE MARKET FOR SQM'S ADS EXHIBITS SERIAL CORRELATION

63.     Economists often describe a weak-form efficient market as one where stock returns
follow a "random walk."[90]  In a "random walk" market, an investor cannot earn a profit
based on information about past stock returns because the share price quickly adjusts to
this information.  This rapid adjustment implies that successive share price changes are
uncorrelated with each other – that is, they are not "serially correlated."  In other words,
past returns do not provide any information that investors can use to predict future
returns.[91]  As described above, economists consider such a market weak-form efficient.
As Mr. Steinholt acknowledged in his deposition, weak-form efficiency is a prerequisite
for semi-strong efficiency, the type of efficiency at issue in this matter.[92]

64.     Economists can evaluate whether serial correlation is present to determine whether stock
returns follow a random walk.  In fact, the study discussed above by Erenburg et al.
(2011) identified stocks that did not trade in weak-form efficient markets by using tests
for serial correlation.  The authors further examined whether these stocks fulfilled the
*Cammer* factors and found that these factors showed "little or no relation to weak-form
market efficiency."[93]

65.     If serial correlation is present and returns do not follow a random walk, then an investor
could use prior stock returns to develop a profitable trading strategy, indicating the
market does not exhibit weak-form efficiency.  I understand that courts, such as in the

---

[90]    *See, e.g.,* Eugene F. Fama, "Random Walks in Stock-Market Prices," Selected Papers No. 16, 1965, p. 1.

[91]    *See, e.g.,* Eugene F. Fama, "Random Walks in Stock-Market Prices," Selected Papers No. 16, 1965, pp. 5-6.

[92]    Steinholt Deposition, p. 75.

[93]    Grigori Erenburg, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of
Market Prices?", *Journal of Empirical Legal Studies,* Vol. 8, Issue 2, Abstract, p. 260.

*PolyMedica* decision,[94] have considered whether a firm's stock price exhibited serial correlation when determining whether the market for a stock is efficient.

66.     To test for serial correlation, I first examined the statistical relation between successive daily returns by conducting a regression analysis with the next-day returns as the dependent variable and prior-day returns as the independent variable.  This is a well-accepted technique in the financial economics literature to test the random walk hypothesis, and thereby test for market efficiency.[95]  If a stock were trading in a weak-form efficient market, prior-day returns should not help to predict the following day's returns, and therefore there should be no statistically significant relationship between prior-day returns and next-day returns.

67.     However, as shown in **Exhibit 4**, a statistically significant relation existed between prior-day returns and next-day returns for SQM's ADS during the Proposed Class Period.  As shown, the statistically significant coefficient of 0.09 indicates that there was a positive relationship between prior-day returns and next-day returns, meaning that SQM's ADS exhibited positive serial correlation.  That is, a price change on a given day enables the market to predict that SQM's ADS price is more likely to move in the same direction on the following day.  Positive serial correlation indicates that SQM's ADS did not trade in a weak-form efficient market during the Proposed Class Period.[96]

---

[94]     *In re PolyMedica Corp. Secs. Litig.*, 453 F. Supp. 2d 260 (D. Mass. 2006).

[95]     *See, e.g.,* Ronald J. Balvers et al, "Predicting Stock Returns in an Efficient Market," *The Journal of Finance*, Vol. 45, No. 4, September 1990, n. 9; John Y. Campbell, et al., "Trading Volume and Serial Correlation in Stock Returns," *The Quarterly Journal of Economics*, November 1993, pp. 910-911.

[96]     I have confirmed these results using a non-parametric runs test, as shown in **Exhibit 5**.

68.     Indeed, this result suggests that an investor could profit using the following "momentum"

trading strategy: if SQM's ADS return is negative today, sell the ADS at the end of the

day; if SQM's ADS return is positive today, buy (or hold) the ADS at the end of the day.

If an investor followed this strategy for SQM's ADS during the Proposed Class Period,

they would have gained approximately 118 percent by the end of the Proposed Class

Period.  In contrast, an investor who bought and held SQM's ADS over the Proposed

Class Period would have lost approximately 43 percent.[97]

69.     To further investigate the profitability of momentum trading in SQM's ADS, I also

considered whether an investor following what is known as a "y-filter trading strategy"

would also earn a profit relative to employing a buy-and-hold strategy, which should not

occur if SQM's ADS traded in a weak-form efficient market.  As described by Fama

(1970), under a y-filter trading strategy:

> If the price of a security moves up at least y%, buy and hold the security
> until its price moves down at least y% from a subsequent high, at which
> time simultaneously sell and go short.  The short position is maintained until
> the price rises at least y% above a subsequent low, at which one covers the
> short position and buys.  Moves less than y% in either direction are
> ignored.[98]

70.     I calculated the profits of a hypothetical SQM ADS buy-and-hold investor relative to an

investor employing 1%, 1.5%, 2%, 2.5%, 3%, and 3.5% filters.[99]  As shown in **Exhibit 6,**

---

[97]   These calculations assume no dividend payments and no trading costs.  That is, an investor following the serial correlation strategy is able to realize and then re-invest the full extent of any returns earned.

[98]   Eugene Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance*, 1970, pp. 394-396.

[99]   Fama (1970) cautions that profits under a y-filter trading rule strategy may be overstated if the analysis does not account for transaction costs.  *See* Eugene Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance*, 1970, p. 396.  Therefore, I assume that there is a $100 fee associated with each transaction, and that an investor may only sell at the bid price and buy at the ask price.  I further assume an initial investment of 10,000 shares, and that the investor following the y-filter trading rule strategy reinvests any profits.

profits for the SQM ADS investor following the trading rule strategy exceeded those earned by the hypothetical buy-and-hold investor for all of the six assumed filters. These results are consistent with my other serial correlation analyses.

71.     As I have shown above, SQM's ADS do not pass the tests for weak-form efficiency commonly used in the academic literature, indicating that SQM's ADS did not trade in an efficient market during the Proposed Class Period.
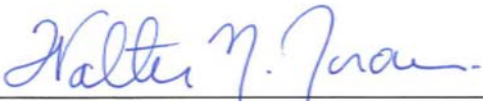
## VII.    CONCLUSION

72.     For the reasons I discuss above, Mr. Steinholt's analysis does not provide evidence from which one can reasonably conclude that SQM's ADS traded in an open, developed, and efficient market at all times during the Proposed Class Period. First, the indirect *Cammer* and *Krogman* factors are insufficient to establish market efficiency. Second, Mr. Steinholt's analysis of the 19 financial release dates is not sufficient to demonstrate a cause-and-effect relationship between new, material information and SQM's ADS price during the Proposed Class Period. Third, my analysis of SQM's ADS price reaction to qualitative news of the type at issue in this case does not support the conclusion that SQM's ADS efficiently incorporated this type of new and material information. Fourth, Mr. Steinholt does not demonstrate that his conclusions apply to the entirety of the nearly five-year Proposed Class Period. Fifth, once Mr. Steinholt's statistical results have been corrected to account for the risk of false positives, Mr. Steinholt's own methodology does not support a strong conclusion of market efficiency. Sixth, Mr. Steinholt's analysis of SQM's ADS price reaction on March 18, 2015 does not reliably establish a cause-and-effect relationship between news and SQM's ADS price.

73.     I further conclude that SQM's ADS returns exhibited serial correlation during the

Proposed Class Period.  These results provide evidence that SQM's ADS traded in an

inefficient market during the Proposed Class Period.

Executed on December 12, 2018

_____
        Walter N. Torous, Ph.D.

# Appendix A
# Curriculum Vitae

## <u>WALTER N. TOROUS</u>

Massachusetts Institute of Technology

## <u>Office Address:</u>

Massachusetts Institute of Technology
Building 9-332
77 Massachusetts Avenue
Cambridge, MA, 02139
Telephone:     (Office)          (617) 324-7027

E-Mail          wtorous@mit.edu

## <u>Home Address</u>

75 Cambridge Parkway, Unit E801
Cambridge, MA, 02142
Telephone:     (310) 873-8325

## <u>Academic Degrees</u>

| | |
|---|---|
| B. Math. | University of Waterloo, Statistics and Economics, 1976 |
| Ph. D. | University of Pennsylvania, Economics, 1981 |
| | Dissertation Title "Differential Taxation and the Equilibrium Structure of Interest Rates" |
| | Supervisor: Robert J. Shiller |
| | Awarded William Polk Carey Prize for Best Doctoral Dissertation |

## <u>Academic Appointments</u>

| | |
|---|---|
| 1980-81 | Graduate School of Business Administration, University of Michigan, Lecturer |
| 1981-85 | Graduate School of Business Administration, University of Michigan, Assistant Professor |
| 1986-87 | Graduate School of Management, University of California, Los Angeles, Visiting Assistant Professor |
| 1987-90 | Graduate School of Management, University of California, Los Angeles, Assistant Professor |

A-1

1990-95        John E. Anderson Graduate School of Management, University of California, Los
               Angeles, Associate Professor

1995-97        London Business School, Corporation of London Professor of Finance

1995-2006      John E. Anderson Graduate School of Management, University of California, Los
               Angeles, Professor

1997-2003      Director, Richard S. Ziman Real Estate Center, John
               E. Anderson Graduate School of Management, University
               of California, Los Angeles

2006-2012      John E. Anderson Graduate School of Management,
               University of California, Los Angeles, Lee and Seymour Graff Endowed Professor

2009-2011      Visiting Professor
               Center for Real Estate
               Massachusetts Institute of Technology, Cambridge, MA

2012-          Senior Lecturer
               Center for Real Estate / Sloan School of Management
               Massachusetts Institute of Technology, Cambridge, MA

## Professional Activities

Journal of Housing Economics, Associate Editor, 1991 -
Journal of Real Estate Finance and Economics, Associate Editor, 1992 -
Real Estate Economics,
        Associate Editor, 1993 - 2005, 2015 -
        Editor, 2006 - 2014
Pacific-Basin Finance Journal, Associate Editor, 1997- 2003
Economic Notes, Associate Editor, 1999 - 2011

Ad hoc referee for Journal of Finance, Journal of Financial and Quantitative Analysis, Journal of
Banking and Finance, Journal of Business, Review of Financial Studies, Journal of Financial
Economics, Journal of Money, Credit, and Banking, Management Science, Journal of Empirical
Finance, Journal of International Money and Finance

Member:
American Finance Association, 1980 -
American Real Estate and Urban Economics Association, 1990 -
Western Finance Association, 1980 -
        Associate Program Chair, 1990
        Board of Directors, 1991-94

**Refereed Publications**

1.  Ball, C. A., and Torous, W. N., "A Simplified Jump Process for Common Stock Returns," Journal of Financial and Quantitative Analysis, 18:1, pp. 53-65, March 1983.

2.  Ball, C. A., and Torous, W. N., "Bond Price Dynamics and Options," Journal of Financial and Quantitative Analysis, 18:4, pp. 517-531, December 1983.

3.  Ball, C. A., and Torous, W. N., "The Maximum Likelihood Estimation of Security Price Volatility: Theory, Evidence, and Application to Option Pricing," Journal of Business, 57:1, pp. 97-112, January 1984.

4.  Milne, W. J., and Torous, W. N., "Long-Term Interest Rates and the Price Level: The Canadian Evidence on the Gibson Paradox," Canadian Journal of Economics, 17:2, pp. 327-339, May 1984.

5.  Ball, C. A., Torous, W. N., and Tschoegl, A. E., "On Inferring Standard Deviations from Path Dependent Options," Economic Letters, 18, pp. 377-380, 1985.

6.  Ball, C. A., Torous, W. N., and Tschoegl, A. E., "The Degree of Price Resolution: The Case of the Gold Market," Journal of Futures Markets, 5:1, pp.29-43, Spring 1985.

7.  Ball, C. A., Torous, W. N., and Tschoegl, A. E., "An Empirical Investigation of the EOE Gold Options Market," Journal of Banking and Finance, 9:1, pp. 101-113, March 1985.

8.  Ball, C. A., and Torous, W. N., "On Jumps in Common Stock Prices and Their Impact on Call Option Pricing," Journal of Finance, 40:1, pp. 155-173, March 1985.

9.  Torous, W. N., "Differential Taxation and the Equilibrium Structure of Interest Rates," Journal of Banking and Finance, 9, pp. 363-385, August 1985.

    Reprinted in The Debt Market, S. Ross (Editor), Edward Elgar, 2000.

10. Ball, C. A., and Torous, W. N., "Futures Options and the Volatility of Futures Prices," Journal of Finance, 41:4, pp. 857-870, September 1986.

11. Ball, C. A., and Torous, W. N., "Investigating Security Price Performance in the Presence of Event Date Uncertainty," Journal of Financial Economics, 22, pp. 123-153, October 1988.

12. Schwartz, E. S., and Torous, W. N., "Prepayment and the Valuation of Mortgage-Backed Securities," Journal of Finance, 44:2, pp. 375-392, June 1989.

13. Titman, S., and Torous, W. N., "Valuing Commercial Mortgages: An Empirical Investigation of the Contingent-Claims Approach to Valuing Commercial Mortgages," Journal of Finance, 44:2, pp. 345-373, June 1989.

    Reprinted in The Debt Market, S. Ross (Editor), Edward Elgar, 2000.

14. Franks, J. R., and Torous, W. N., "An Empirical Investigation of U.S. Firms in Reorganization," Journal of Finance, 44:3, pp. 747-769, July 1989.

    Reprinted in Corporate Bankruptcy and Distressed Restructurings: Analytical Issues and Investment Opportunities, E. Altman (Editor), Irwin, 1992.

15. Schwartz, E. S., and Torous, W. N., "Valuing Stripped Mortgage-Backed Securities," Housing Finance Review, 8, pp. 241-251, Fall 1989.

    Reprinted in The Debt Market, S. Ross (Editor), Edward Elgar, 2000.

16. Haugen, R. A., Talmor, E., and Torous, W. N., "The Effect of Volatility Changes on the Level of Stock Prices and Subsequent Expected Returns," Journal of Finance, 46:8, pp. 985-1007, July 1991.

17. Geske, R. L., and Torous, W. N., "Skewness, Kurtosis, and Black-Scholes Option Mispricing," Statistical Papers, 32, pp. 299-309, December 1991.

18. Schwartz, E. S., and Torous, W. N., "Prepayment, Default, and the Valuation of Mortgage Pass-Through Securities," Journal of Business, 65:2, pp. 221-239, April 1992.

19. Franks, J. R., and Torous, W. N., "Lessons from a Comparison of U.S. and U.K. Insolvency Codes," Oxford Review of Economic Policy, 8:3, pp. 70-82, September 1992.

    Reprinted in Journal of Applied Corporate Finance, pp. 95-103, January 1993.

20. Schwartz, E. S., and Torous, W. N., "Mortgage Prepayment and Default Decisions: A Poisson Regression Approach", Journal of the American Real Estate and Urban Economics Association, 21:4, pp. 431-448, March 1993.

21. Franks, J. R., and Torous, W. N., "A Comparison of Financial Recontracting in Workouts and Chapter 11 Reorganizations," Journal of Financial Economics, 28:8, pp. 349-370, June 1994.

    Reprinted in Studies in Empirical Corporate Finance, M. Brennan (Editor), Edward Elgar, 2001.

22. Ball, C. A., and Torous, W. N., "On Unit Roots and the Estimation of Interest Rate Dynamics", Journal of Empirical Finance, 3:2, pp. 215-238, June 1996.

23. Franks, J. R., Nyborg, K., and Torous, W. N., "A Comparison of U. K, U. S., and German Insolvency Codes," Financial Management, 25:3, pp. 274-301, Autumn 1996.

24. Roma, A., and Torous, W. N., "On the Cyclical Behavior of Interest Rates," Journal of Finance, 52:4, pp. 1519-1542, September 1997.

25. Brennan, M. J., and Torous, W. N., "Individual Decision Making and Investor Welfare," Economic Notes, 28:2, pp. 119-143, July 1999.

26. Ball, C. A., and Torous, W. N., "The Stochastic Volatility of Short-term Interest Rates: Some International Evidence," Journal of Finance, 54:6, pp. 2339-2359, December 1999.

    Reprinted in Model Risk: Concepts, Calibration, and Pricing, R. Gibson (Editor), Risk Books, 2000.

27. Ball, C. A., and Torous, W. N., "Stochastic Correlation Across International Stock Markets," Journal of Empirical Finance, 7:3-4, pp. 373-388, November 2000.

28. Torous, W. N., Yan, S. and Valkanov, R., "On Predicting Stock Returns with Nearly Integrated Explanatory Variables," Journal of Business, 77:4, pp. 937-966, October 2004.

29. Dierker, M., Quan, D., and Torous, W. N., "Pricing the Defeasance Option in Securitized Commercial Mortgages," Real Estate Economics, 33:4, pp. 663-680, Winter 2005.

30. Berardi, A., and Torous, W. N., "Term Structure Forecasts of Long Term Consumption Growth," Journal of Financial and Quantitative Analysis, 40:2, pp. 241-258, June 2005.

31. Brennan, M. J., Lee, F., and Torous, W. N., "Dollar Cost Averaging", Review of Finance, 9:4, pp. 509-535, 2005.

32. Hong, H, Torous, W. N., and Valkanov, R., "Do Industries Lead Stock Markets?", Journal of Financial Economics, 83:2, pp. 367-396, 2007.

33. Schwartz, E. S., and Torous, W. N., "Commercial Office Space: Testing the Implications of Real Options Model with Competitive Interactions", Real Estate Economics, 35:1, pp. 1-20, 2007.

    Awarded Edwin S. Mills Prize for best paper in Real Estate Economics for 2007.

34. Plazzi, A., Torous, W. N., and Valkanov, R., "The Cross-Sectional Dispersion of Commercial Real Estate Returns and Rent Growth: Time Variation and Economic Fluctuations", Real Estate Economics, 36:3, pp. 403-429, 2008.

35. Plazzi, A., Torous, W. N., and Valkanov, R., "Expected Returns and the Expected Growth in Rents of Commercial Real Estate", Review of Financial Studies, 23:9, pp. 3469-3519, 2010.

36. Plazzi, A., Torous, W.N., and Valkanov, R., "Exploiting Property Characteristics in Commercial Real Estate Portfolio Allocation", Journal of Portfolio Management, Special Real Estate Issue, pp. 39-50, 2011.

37. Linnainmaa, J. T., Torous, W. N., and Yae, J., "Reading the Tea Leaves: Model Uncertainty, Robust Forecasts and the Autocorrelation of Analysts' Forecast Errors" Journal of Financial Economics, 122:1, pp. 42-64, 2016.

38. Ghent, A., Torous, W. N., and Valkanov, R., "Complexity in Structured Finance", forthcoming, Review of Economic Studies, 2018.

39. Ghent, A., Miltersen, K., and Torous, W. N., "Second Mortgages: Valuation and Implications for the Performance of Structured Financial Products", forthcoming, Real Estate Economics, 2018.

**Chapters in Books**

40. Geske, R. L., and Torous, W. N., "Black-Scholes Option Pricing and Robust Variance Estimation," pp. 49-69, in Options: Recent Advances in Theory and Practice, S. Hodges (Editor), Manchester University Press, 1990.

41. Schwartz, E. S., and Torous, W. N., "Caps on Adjustable Rate Mortgages: Valuation, Insurance, and Hedging," pp. 283-303, in <u>Financial Markets and Financial Crises</u>, R. G. Hubbard (Editor), University of Chicago Press, 1991.

42. Betker, B. L., Franks, J. R., and Torous, W. N., "Are Stockholders Better Off When Debt is Restructured Privately?", pp. 391-400, in <u>Corporate Bankruptcy and Distressed Restructuring: Analytical Issues and Investment Opportunities</u>, E. Altman (Editor), Irwin, 1992.

43. Torous, W. N., "Mortgage Backed Securities," in <u>North-Holland Handbook of Operations Research and Management Science</u>, R. A. Jarrow, V. Maksimmovic, and W. T. Ziemba (Editors), North-Holland, 1995.

44. Franks, J. R., Nyborg, K, and Torous, W. N., "A Tale of Three Codes: A Comparison of U. K., U. S., and German Insolvency Codes," in <u>Mastering Finance</u>, H. Rose (Editor), Pittman Publishing, 1998.

45. Torous, W. N. "The Behaviour of Short Term Interest Rates," in <u>Mastering Finance</u>, H. Rose (Editor), Pittman Publishing, 1998.

46. Schwartz, E. S., and Torous, W. N., "Can We Disentangle Risk Aversion from Intertemporal Substitution in Consumption?", in <u>Essays on Uncertainty: Festschrift in Honor of Steinar Ekern</u>, Norges Handelshoyskole, Bergen, Norway, 2002.

47. Ghyssels, E., Plazzi, A., Torous, W. N., and R. Valkanov, R., "Forecasting Real Estate Prices", in <u>Handbook of Economic Forecasting,</u> Volume 2A, G. Elliott and A. Timmermann (Editors), North-Holland, 2013.

## Submitted Manuscripts

48. Agarwal, S., Liu, C., Torous, W. N., and Yao, V. W., "Household Financial Decision Making when Buying and Owning a Home", submitted, <u>Journal of Money, Credit, and Banking</u>, 2017.

## Working Papers

49. Bokhari, S., Torous, W. N., and Wheaton, W., "Leverage in the Housing Boom and Bust", 2015.

50. Boudry, W., Liu, C., Mulhofer, T., and Torous, W.N., "Using Cash Flow Dynamics to Price Thinly Traded Assets", 2017.

51. Plazzi, J, and Torous, W.N., "Does Corporate Governance Matter? Evidence from the AGR Governance Rating", 2017.

**Appendix B**
**WALTER N. TOROUS**

**List of Testimony in the Last Four Years**

2018 – *United States of America v. Quicken Loans, Inc.,* In the United States District Court for the Eastern District of Michigan, Case No. 16-14050-MAG-RSW
Provided expert report and deposition testimony.

2018 – *U.S. Bank National Association, solely in its capacity as trustee of the CSMC Asset-Backed Trust 2007-NC1 (CSMC 2007-NC1) v. DLJ Mortgage Capital, Inc.,* In the Supreme Court of the State of New York, County of New York, Index No. 652699/2013
Provided expert report and deposition testimony.

2018 – *U.S. Bank National Association, solely in its capacity as trustee of the Home Equity Asset Trust 2007-2 (HEAT 2007-2) v. DLJ Mortgage Capital, Inc.,* In the Supreme Court of the State of New York, County of New York, Index No. 651174/2013
Provided expert report and deposition testimony.

2018 – *U.S. Bank National Association, solely in its capacity as trustee of the Home Equity Asset Trust 2006-8 (HEAT 2006-8) v. DLJ Mortgage Capital, Inc.,* In the Supreme Court of the State of New York, County of New York, Index No. 654157/2012
Provided expert report and deposition testimony.

2018 – *Residential Funding Company, LLC v. Home Loan Center, Inc.,* In the United States District Court for the District of Minnesota, Case No. 14-cv-01716 (SRN/HB)
Provided expert report and deposition testimony.

2018 – *Residential Funding Company, LLC v. Decision One Mortgage Company, LLC,* In the United States District Court for the District of Minnesota, Case No. 14-cv-1737 (MJD/JSM)
Provided expert report and deposition testimony.

2018 – *Residential Funding Company, LLC v. HSBC Mortgage Corp. (USA),* In the United States Bankruptcy Court for the Southern District of New York, Case No. 14-01915 (MG)
Provided expert report and deposition testimony.

2018 – *Federal Deposit Insurance Corporation as Receiver for United Western Bank v. RBS Acceptance Inc., et al.,* In the United States District Court for the District of Colorado, Case No. 1:14-CV-00418-PAB-MJW
Provided expert report and deposition testimony.

2018 – *Federal Deposit Insurance Corporation as Receiver for Guaranty Bank v. Deutsche Bank Securities Inc., et al.,* In the United States District Court for the Western District of Texas Austin Division, Case No. 1:14-cv-00129-SS
Provided expert report and deposition testimony.

2018 – *Federal Deposit Insurance Corporation as Receiver for Guaranty Bank v. RBS Securities Inc., et al.,* In the United States District Court for the Western District of Texas Austin Division, Case No. 1:14-cv-00126-SS
Provided expert report and deposition testimony.

2017 – *Ramon Moreno, et al. v. Deutsche Bank Americas Holding Corp., et al.*, In the United States District Court for the Southern District of New York, Case No. 1:15-cv-09936 (LGS)
Provided expert report and deposition testimony.

2017 – *Lou Baker, et al. v. SeaWorld Entertainment, Inc., et al.*, In the United States District Court for the Southern District of California, Case No. 3:14-cv-02129-MMA-AGS
Provided expert report and deposition testimony.

2017 – *Old Republic Insurance Company and Old Republic Insured Credit Services, Inc., n/k/a Republic Insured Credit Services, Inc. v. The Bank of New York Mellon, BNY Mellon Trust of Delaware, Countrywide Bank, FSB, n/k/a Bank of America, N.A., Countrywide Home Loans Servicing, LP, n/k/a Bank of America, N.A.; Countrywide Bank, FSB, n/k/a Bank of America, N.A., Countrywide Home Loans, Inc., Countrywide Home Loans Servicing, LP, n/k/a Bank of America, N.A., The Bank of New York Mellon, and BNY Mellon Trust of Delaware v. Old Republic Insurance Company;* In the Circuit Court of Cook County, Illinois for the County Department, Chancery Division, Case No. 08 CH 47501
Provided expert report and deposition testimony.

2017 – *Royal Park Investments SA/NV v. HSBC Bank USA, National Association*, In the United STATES District Court for the Southern District of New York, Case No. 14-cv-8175-LGS-SN; *BlackRock Balanced Capital Portfolio (FI), et al. v. HSBC Bank USA, National Association,* In the United States District Court for the Southern District of New York, Case No. 14-cv-9366-LGS-SN
Provided expert report and deposition testimony.

2017 – *U.S. Bank National Association, solely in its capacity as Trustee for Citigroup Mortgage Loan Trust 2007-AR7 v. Citigroup Global Markets Realty Corp. and CitiMortgage, Inc.,* In the United States District Court for the Southern District of New York, Civil Action No. 13 Civ. 6989 (GBD)
Provided expert report and deposition testimony.

2016 – *U.S. Bank National Association, solely in its capacity as Trustee of the Home Equity Asset Trust 2007-1 (HEAT 2007-1) v. DLJ Mortgage Capital, Inc.*, In the Supreme Court of the State of New York County of New York, Index No. 650369/2013
Provided expert report and deposition testimony.

2016 – *Federal Deposit Insurance Corporation v. Credit Suisse First Boston Mortgage Securities Corp., et al.,* In the Circuit Court of Montgomery County, Alabama, Civil Action No. 03-cv-2012-901035.00 and *Federal Deposit Insurance Corporation v. RBS Securities Inc.,* In the Circuit Court of Montgomery County, Alabama, Civil Action No. 03-cv-2012-901036.00
Provided expert report and deposition testimony.

2016 – *Home Equity Mortgage Trust Series 2006-1, et al. v. DLJ Mortgage Capital, Inc. and Select Portfolio Servicing, Inc.,* In the Supreme Court of the State of New York, County of New York, Index No. 156016; *Home Equity Mortgage Trust Series 2006-5, by U.S. Bank National Association, solely in its capacity as Trustee v. DLJ Mortgage Capital, Inc. and Select Portfolio Servicing, Inc.,* In the Supreme Court of the State of New York, County of New York, Index No. 653787
Provided expert report and deposition testimony.

2016 – *Federal Deposit Insurance Corporation v. RBS Securities Inc.,* In the Circuit Court of Montgomery County, Alabama, Civil Action No. 03-cv-2012-901036.00
Provided expert report and deposition testimony.

2016 – *National Credit Union Administration Board v. RBS Securities Inc., et al.,* In the United States District Court for the Central District of California, Case No. 11-cv-5887 GW (JEM)
Provided expert report and deposition testimony.

2016 – *National Credit Union Administration Board v. RBS Securities Inc., et al.,* In the United States District Court for the District of Kansas, Case No. 11-cv-2340 JWL (JPO)
Provided expert report and deposition testimony.

2016 – *Federal Home Loan Bank of San Francisco v. Deutsche Bank Securities Inc., et al.*, In the Superior Court of the State of California and for the City and County of San Francisco, Case No. CGC-10-497839
Provided expert report and deposition testimony.

2016 – *Federal Housing Finance Agency v. The Royal Bank of Scotland Group PLC, et al.,* In the United States District Court of Connecticut, Case No. 3:11-cv-01383 (AWT)
Provided expert report and deposition testimony.

2015 – *Deutsche Bank National Trust Company, as Trustee for Morgan Stanley ABS Capital I Inc. Trust 2007-HE6 v. Decision One Mortgage Company, LLC*, In the Circuit Court of Cook County, Illinois County Department – Law Division, Case No. 2013 L 005823
Provided expert report and deposition testimony.

2015 – *New Jersey Carpenters Health Fund, on Behalf of Itself and All Others Similarly Situated v. Novastar Mortgage, Inc., et al.*, In the United States District Court for the Southern District of New York, Case No. 08-cv-5310 (DAB)
Provided expert report and deposition testimony.

2015 – *In Re MF Global Holdings Limited Securities Litigation*, In the United States District Court Southern District of New York, Case No. 1:11-cv-07866-VM
Provided expert report and deposition testimony.

2015 – *Federal Home Loan Bank of Seattle, a bank created by federal law v. Deutsche Bank Securities Inc., a Delaware corporation; Deutsche Alt-A Securities, Inc., a Delaware corporation; and DB Structured Products, Inc., a Delaware corporation*, In the Superior Court of Washington for King County, Case No. 09-2-46351-4 SEA
Provided expert report and deposition testimony.

2015 – *Federal Home Loan Bank of Seattle, a bank created by federal law v. RBS Securities Inc., f/k/a/ Greenwich Capital Markets, Inc., a Delaware Corporation; Greenwich Capital Acceptance, Inc., a Delaware Corporation; and RBS Holdings USA, Inc., f/k/a Greenwich Capital Holdings, Inc., a Delaware Corporation*, In the Superior Court of Washington for King County, Case No. 09-2-46347-6
Provided expert report and deposition testimony.

2015 – *Fort Worth Employees' Retirement Fund, On Behalf of Itself and All Others Similarly Situated v. J.P. Morgan Chase & Co., et al.*, In the United States District Court for the Southern District of New York, Case No. 1:09-cv-03701 (JPO)
Provided expert report and deposition testimony.

2014 – *Federal Home Loan Bank of Seattle, a bank created by federal law v. RBS Securities Inc., f/k/a/ Greenwich Capital Markets, Inc., a Delaware Corporation; Greenwich Capital Acceptance, Inc., a Delaware Corporation; and RBS Holdings USA, Inc., f/k/a Greenwich Capital Holdings, Inc., a Delaware Corporation*, In the Superior Court of Washington for King County, Case No. 09-2-46347-6
Provided expert report and deposition testimony.

2014 – *Federal Housing Finance Agency, as Conservator for the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation v. HSBC North America Holdings Inc., HSBC USA Inc., HSBC Markets (USA) Inc., HSBC Bank USA, N.A., HSI Asset Securitization Corporation, HSBC Securities (USA) Inc., Neal Leonard, Gerard Mattia, Todd White Norman Chaleff, and Jon Voigtman*, In the United States District Court for the Southern District of New York, Case No. 11 Civ. 6189 (DLC)
Provided expert report and deposition testimony.

B-4

2014 – *Massachusetts Mutual Life Insurance Company v. DB Structured Products, Inc., et al.*, In the United States District Court for the District of Massachusetts, Case No. 3:11-cv-30039-MGM
Provided expert report and deposition testimony.

2014 – *New Jersey Carpenters Health Fund, New Jersey Carpenters Vacation Fund, and Boilermaker Blacksmith National Pension Trust, on Behalf of Themselves and All other Similarly Situated v. Residential Capital, LLC. et al*., In the United States District Court for the Southern District of New York, Civil Action No. 08-cv-8781 (HB)
Provided expert report and deposition testimony.

2014 – *Western and Southern Life Insurance Company, et al., v. DLJ Mortgage Capital, Inc. et al.,* In the Court of Common Pleas, Hamilton County, Ohio, No. A 1105352
Provided expert report and deposition testimony.

# Appendix C
# Documents Considered

*Legal Filings*

*Megan Villella, et al. v. Chemical and Mining Company of Chile Inc., et al.,* Corrected Consolidated Complaint for Violation of the Securities Laws, February 9, 2016

*Expert Reports and Depositions*

Deposition of Bjorn Steinholt, November 9, 2018

Expert Report of Bjorn I. Steinholt, CFA, January 10, 2018 including all exhibits and supporting materials

Expert Backup of Bjorn I. Steinholt:
   TW0010845.XLSX
   TW0010846.XLSX
   TW0010847.XLSX

*Other Bates-Stamped Documents*

Analyst Reports: 2-26-2010 through 3-3-2011 (TW0010330-0506)

Analyst Reports: 3-3-2011 through 4-9-2012 (TW0009960-10329)

Analyst Reports: 5-22-2012 through 5-29-2013 (TW0009577-9959)

Analyst Reports: 5-29-2013 through 5-19-2014 (TW0009195-9576)

Analyst Reports: 5-21-2014 through 5-21-2015 (TW0008769-09172)

*Court Cases*

*Basic, Inc. v. Levinson,* 485 U.S. 224 (1988)

*Cammer v. Bloom,* 711 F. Supp. 1264 (D.N.J. 1989)

*Halliburton Co. v. Erica P. John Fund, Inc.,* 134 S. Ct. 636 (2013)

*In re PolyMedica Corp. Secs. Litig.,* 453 F. Supp. 2d 260 (D. Mass. 2006)

*Krogman v. Sterritt,* 202 F.R.D. 467 (N.D. Tex. 2001)

*Books and Academic Articles*

Abdi, Herve, "Holm's Sequential Bonferroni Procedure," *Encyclopedia of Research Design,* Thousand Oaks: Sage, 2010

Bajaj, Mukesh, et al., "Assessing Market Efficiency for Reliance on the Fraud-on-the-Market Doctrine after Wal-Mart and Amgen," *Research in Law and Economics,* Vol. 26, 2014

Ball, Clifford A. and Torous, Walter N., "Investigating Security Price Performance in the Presence of Event-Date Uncertainty," *Journal of Financial Economics* 22, 1988

Balvers, Ronald J., et al., "Predicting Stock Returns in an Efficient Market," *The Journal of Finance,* Vol. 45, No. 4, September 1990

Barber, Brad M., et al., "The Fraud-on-the-Market Theory and the Indicators of Common Stocks' Efficiency," *Journal of Corporation Law* 19, 1994

Brealey, Richard A., et al., *Principles of Corporate Finance,* Tenth Edition, 2011

Campbell, John Y., et al., "Trading Volume and Serial Correlation in Stock Returns," *The Quarterly Journal of Economics,* November 1993

Cornell, Bradford and Rutten, James, "Market Efficiency, Crashes, and Securities Litigation," *Tulane Law Review* , Vol. 81, 2006

## Appendix C
## Documents Considered

Erenburg, Grigori, et al., "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of Market Prices?", *Journal of Empirical Legal Studies* 8(2), 2011

Fama, Eugene, "Random Walks in Stock-Market Prices," Selected Papers No. 16, 1965

Fama, Eugene, "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance,* 1970

Fedenia, Mark and Hirschey, Mark, "The Chipotle Paradox," *Journal of Applied Finance,* Vol. 19, 2009

Holm, Sture, "A simple sequentially rejective multiple test procedure," *Scandinavian Journal of Statistics* 6 (2), 1979

Hong, H., Torous, Walter N., and Valkanov, R., "Do Industries Lead Stock Markets?", *Journal of Financial Economics*, 83:2, 2007

Huberman, Gur and Regev, Tomer, "Contagious Speculation and a Cure for Cancer: A Nonevent that Made Stock Prices Soar," *The Journal of Finance,* Vol. 56, No. 1, February 2001

Lamont, Owen and Thaler, Richard, "Can the Market Add and Subtract? Mispricing in Tech Stock Carve-Outs," *Journal of Political Economy* 111, 2003

Lamont, Owen and Thaler, Richard, "The Law of One Price in Financial Markets," *Journal of Economic Perspectives* 17, 2003

MacKinlay, Craig, "Event Studies in Economics and Finance," *Journal of Economic Literature*, Vol. XXXV, March 1997

Shleifer, Andrei and Vishny, Robert W., "The Limits of Arbitrage," *The Journal of Finance,* Vol. 52, No. 1, March 1997

Tetlock, Paul C. "All the News That's Fit to Reprint: Do Investors React to Stale Information?" *The Review of Financial Studies,* Vol. 24, No. 5, 2011

*Other Public Sources*

Bloomberg, Earnings Calendar, available at: https://www.bloomberg.com/markets/earnings-calendar/us

Morningstar, Earnings Calendar, available at: http://www.morningstar.com/earnings/earnings-calendar.aspx

Patterson, Scott, "Lithium Boom Raises Question: What Is Its Price?," *Wall Street Journal,* November 27, 2018, available at: https://www.wsj.com/articles/lithium-boom-raises-question-what-is-its-price-1543323600

Socieded Química y Minera de Chile S.A., Form 20-F for the fiscal year ending December 31, 2013

SQM, Calendar, available at: http://ir.sqm.com/English/investor-relation/ir-calendar/default.aspx?ShowEvents=FUTURE

*Data*

Bloomberg

SEC Edgar

**Exhibit 1**
**Non-Earnings SEC Form 6-Ks Removing Form 6-Ks Containing Stale Information**
*Proposed Class Period: June 30, 2010 - March 18, 2015*

| | Announcement Date(s) | Time of Announcement | Effective Trading Date | Actual Return | Steinholt Event Study | | | 6-K Topic |
|---|---|---|---|---|---|---|---|---|
| | | | | | Abnormal Return | p-value | Significance (5%) | |
| [1] | 3/15/2011 | 5:26 PM | 3/16/2011 | -2.38% | -1.73% | 0.07 | No | Recommendation by the Board of Directors to pay a dividend of 50% of net profits obtained by SQM during the 2010 fiscal year |
| [2] | 11/28/2011 | 6:04 PM | 11/29/2011 | 0.64% | 0.90% | 0.44 | No | Announcement of a provisional dividend to be paid on December 19, 2011 |
| [3] | 12/16/2011 | 4:08 PM | 12/19/2011 | 1.62% | 2.66% | 0.02 | Yes | Authorization for the issuance and registry of two Lines of Bonds |
| [4] | 12/19/2011 | 4:06 PM | 12/20/2011 | 2.13% | -1.37% | 0.24 | No | Sale of mining claims to SG for SG's use in its Sierra Gorda Mining Project |
| [5] | 3/14/2012 | 4:31 PM | 3/15/2012 | 1.19% | -0.20% | 0.86 | No | Recommendation by the Board of Directors to pay a dividend of 50% of the distributable net income obtained by SQM during the 2011 fiscal year |
| [6] | 9/24/2012 | 6:53 PM | 9/25/2012 | -1.79% | -1.55% | 0.10 | No | SQM "qualified" as the winner of a special operating contract for Lithium extraction and processing in Chile (CEOL) |
| [7] | 11/23/2012 | 6:08 AM | 11/23/2012 | -0.56% | -0.86% | 0.32 | No | Announcement of an interim dividend to be paid on December 12, 2012 |
| [8] | 3/13/2013 | 12:40 PM | 3/13/2013 | 0.02% | 0.53% | 0.56 | No | Recommendation by the Board of Directors to pay a dividend of 50% of the distributable net income obtained by SQM during the 2012 fiscal year |
| [9] | 4/3/2013 | 4:15 PM | 4/4/2013 | -0.37% | -0.72% | 0.42 | No | Issuance of USD $300 million bond in international markets |
| [10] | 4/8/2013 | 11:37 AM | 4/8/2013 | 0.47% | -0.26% | 0.77 | No | Resignation of Mr. Kendrick T. Wallace from his position as Director of SQM for personal reasons |
| [11] | 5/30/2013 | 8:16 PM | 5/31/2013 | -0.17% | 0.31% | 0.73 | No | Summary of earnings call for 1Q 2013 held on May 30, 2013 |
| | 5/31/2013 | 10:47 AM | | | | | | Agreement by the Board of Directors on May 28, 2013 to approve the General Policy for Habitual-Ordinary Operations of SQM S.A.'s lines of business |
| [12] | 6/19/2013 | 7:05 PM | 6/20/2013 | -5.08% | -1.52% | 0.09 | No | Submission of information in regard to the implementation of corporate governance practices |
| [13] | 8/7/2013 | 6:06 PM | 8/8/2013 | 2.04% | -1.99% | 0.09 | No | Response to a notification from the Superintendent of Securities and Insurance from August 5, 2013 regarding the production and marketing of Potassium Chloride |
| [14] | 9/11/2013 | 12:26 PM | 9/11/2013 | 1.17% | 1.00% | 0.44 | No | Amendment to original mining rights for the "Antucoya Mining Project" where SQM will receive a lump sum rather than the agreed variable annual royalty |
| [15] | 11/6/2013 | 4:34 PM | 11/7/2013 | -1.04% | -0.56% | 0.67 | No | Response to a notification from the Superintendent of Securities and Insurance from October 30, 2013 regarding changes to SQM's production practices |
| [16] | 12/2/2013 | 4:58 PM | 12/3/2013 | -0.12% | 1.49% | 0.28 | No | Report of projections for sales volumes and prices of potash and iodine |
| [17] | 12/19/2013 | 1:56 PM | 12/19/2013 | 0.21% | 0.47% | 0.74 | No | Issuance of Series A shares on the Santiago Stock Exchange |
| [18] | 1/16/2014 | 1:40 PM | 1/16/2014 | -1.12% | -0.95% | 0.52 | No | Response to letter from the Santiago Stock Exchange on January 15, 2014 that asked for information that could explain significant price movement in the series B shares on that day; SQM was not aware of any concrete reasons that could explain the change |
| [19] | 4/2/2014 | 11:18 AM | 4/2/2014 | -1.85% | -1.28% | 0.43 | No | Preliminary evaluation of the effects on the Company's productive facilities of an earthquake that occurred in Northern Chile. No damage was found, but electricity was out at two mines |

**Exhibit 1**
**Non-Earnings SEC Form 6-Ks Removing Form 6-Ks Containing Stale Information**
*Proposed Class Period: June 30, 2010 - March 18, 2015*

| | Announcement Date(s) | Time of Announcement | Effective Trading Date | Actual Return | Steinholt Event Study | | | 6-K Topic |
|---|---|---|---|---|---|---|---|---|
| | | | | | Abnormal Return | p-value | Significance (5%) | |
| [20] | 5/22/2014 | 5:46 PM | 5/23/2014 | 1.12% | 0.40% | 0.82 | No | Description of law suit filed by Economic Development Corporation (CORFO) on May 16, 2014 against SQM involving a leasing contract signed on November 12, 1993 |
| | 5/22/2014 | 7:17 PM | | | | | | Summary of earnings call for 1Q 2014 held on May 22, 2014 |
| [21] | 6/6/2014 | 6:44 PM | 6/9/2014 | 1.28% | 1.48% | 0.40 | No | Announcement of the Board's decision to: (1) modify the current dividend policy for 2014 fiscal year; and (2) convene an extraordinary general shareholder meeting on July 7, 2014 |
| [22] | 10/15/2014 | 5:07 PM | 10/16/2014 | 3.01% | 3.21% | 0.06 | No | Announcement that SQM is subject to changes to the Chilean Income Tax Law |
| [23] | 10/22/2014 | 8:56 AM | 10/22/2014 | -2.57% | -2.20% | 0.19 | No | Announcement that SQM is amending and restating its prior Form 6-K filed October 20, 2014 |
| [24] | 10/23/2014 | 11:25 AM | 10/23/2014 | 1.80% | 1.46% | 0.38 | No | Announcement that changes to the Chilean Income Tax Law will not impact SQMs income statement, but will result in a direct charge against equity |
| [25] | 10/28/2014 | 5:39 PM | 10/29/2014 | 0.09% | 0.56% | 0.74 | No | Issuance of $250 million in unsecured notes in international markets |
| [26] | 11/19/2014 | 4:42 PM | 11/20/2014 | 3.17% | 2.71% | 0.11 | No | Announcement of a provisional dividend to be paid on December 12, 2014 |
| [27] | 2/26/2015 | 4:39 PM | 2/27/2015 | -0.54% | -1.00% | 0.51 | No | Establishment of a special committee to analyze matters that are the subject of recent news and ongoing public cases |
| [28] | 3/11/2015 | 7:04 PM | 3/12/2015 | -1.20% | -1.89% | 0.20 | No | Press release regarding request by Public Prosecutor for SQM to turn over accounting records in improper political campaign contributions investigation |
| [29] | 3/12/2015 | 7:57 PM | 3/13/2015 | -2.86% | -0.83% | 0.58 | No | Announcement that SQM will comply with the prosecution as well as a request for an independent report |
| [30] | 3/16/2015 | 6:08 PM | 3/17/2015 | -1.82% | -1.76% | 0.23 | No | Termination of CEO Patricio Contesse G. |
| [31] | 3/18/2015 | 8:18 AM | 3/18/2015 | -15.61% | -16.70% | 0.00 | Yes | Wayne R. Brownlee, José María Eyzaguirre B., and Alejandro Montero P. have resigned as Board members of SQM |

**Sources:**
[A]  Expert Report of Bjorn I. Steinholt, CFA, and Appendices Thereto
[B]  SEC Edgar

**Notes:**
[1]  The Announcement Date represents the date that SQM filed its Form 6-Ks with the SEC during the Class Period.
[2]  The Effective Trading Date represents the date on which the information could begin to affect the market price. For example, for an announcement on a weekend, holiday, or after the close of market, the Effective Trading Date would be the following trading day.
[3]  Table removes (1) the 19 financial release dates tested by Mr. Steinholt (including financial release dates when dividend announcements were also made); (2) effective trading dates associated with 6-K filings summarizing earnings conference calls held on the prior day during market hours; (3) effective trading dates associated with resubmissions of financial information previously filed with the Chilean SVS or otherwise contained in the prior financial releases; and (4) effective trading dates associated with summaries of agreements reached at prior shareholder meetings.

**Exhibit 2A**
**Significance of Earnings Release Dates Applying Holm-Bonferroni Correction**
*Proposed Class Period: June 30, 2010 - March 18, 2015*

| Dates Tested by Mr. Steinholt | SQM ADS Actual Return | Mr. Steinholt Event Study Results | | Significance[1] | |
| --- | --- | --- | --- | --- | --- |
| | | *t*-Stat | *p*-Value | Mr. Steinholt Finding | Holm-Bonferroni Corrected[2] |
| 9/1/2010 | 2.86% | 1.18 | 0.24 | No | No |
| 11/24/2010 | 1.25% | -0.42 | 0.68 | No | No |
| 3/2/2011 | 0.40% | 0.40 | 0.69 | No | No |
| 5/25/2011 | 0.78% | -0.65 | 0.51 | No | No |
| 8/31/2011 | 2.75% | 2.35 | 0.02 | Yes | No |
| 11/23/2011 | -2.79% | 0.82 | 0.42 | No | No |
| 3/7/2012 | 0.25% | -0.51 | 0.61 | No | No |
| 5/30/2012 | -1.27% | 0.34 | 0.73 | No | No |
| 8/29/2012 | 2.18% | 1.87 | 0.06 | No | No |
| 11/21/2012 | -4.96% | -5.37 | 0.00 | Yes | Yes |
| 3/6/2013 | -2.80% | -2.78 | 0.01 | Yes | No |
| 5/29/2013 | -0.91% | -1.59 | 0.11 | No | No |
| 8/28/2013 | -1.42% | -0.47 | 0.64 | No | No |
| 11/20/2013 | -8.47% | -5.26 | 0.00 | Yes | Yes |
| 3/5/2014 | 4.63% | 1.74 | 0.08 | No | No |
| 5/21/2014 | 2.06% | 1.32 | 0.19 | No | No |
| 8/27/2014 | -1.53% | -0.98 | 0.33 | No | No |
| 11/19/2014 | 6.60% | 3.08 | 0.00 | Yes | Yes |
| 3/4/2015 | 0.23% | 1.07 | 0.29 | No | No |
| | | | *Total Significant* | 5 | 3 |

**Source:** Expert Report of Bjorn I. Steinholt, CFA, and Appendices Thereto

**Notes:**

[1] At 5% significance level.

[2] For each date, the *p*-value is evaluated sequentially by ascending *p*-value against a Holm-Bonferroni value calculated as significance level/(number of hypotheses + 1 - rank of *p*-value). For example, the smallest *p*-value is compared to a Holm-Bonferroni value of 5% / (19 + 1 - 1). The second smallest, 5% / (19 + 1 - 2), etc. If the date's *p*-value is less than the Holm-Bonferroni value, the date is considered significant (*i.e.* the null hypothesis is rejected); upon reaching a *p*-value that is not significant, the remaining dates are determined not significant. *See* Sture Holm, "A Simple Sequentially Rejective Multiple Test Procedure," *Scandinavian Journal of Statistics* 6 (2), 1979, pp. 65-70.

## Exhibit 2B
## Significance of Earnings Release Dates Applying Sidak Correction
*Proposed Class Period: June 30, 2010 - March 18, 2015*

| Dates Tested by Mr. Steinholt | SQM ADS Actual Return | Mr. Steinholt Event Study Results | | Significance[1] | |
| --- | --- | --- | --- | --- | --- |
| | | *t*- Stat | *p*- Value | Mr. Steinholt Finding | Sidak Corrected[2] |
| 9/1/2010 | 2.86% | 1.18 | 0.24 | No | No |
| 11/24/2010 | 1.25% | -0.42 | 0.68 | No | No |
| 3/2/2011 | 0.40% | 0.40 | 0.69 | No | No |
| 5/25/2011 | 0.78% | -0.65 | 0.51 | No | No |
| 8/31/2011 | 2.75% | 2.35 | 0.02 | Yes | No |
| 11/23/2011 | -2.79% | 0.82 | 0.42 | No | No |
| 3/7/2012 | 0.25% | -0.51 | 0.61 | No | No |
| 5/30/2012 | -1.27% | 0.34 | 0.73 | No | No |
| 8/29/2012 | 2.18% | 1.87 | 0.06 | No | No |
| 11/21/2012 | -4.96% | -5.37 | 0.00 | Yes | Yes |
| 3/6/2013 | -2.80% | -2.78 | 0.01 | Yes | No |
| 5/29/2013 | -0.91% | -1.59 | 0.11 | No | No |
| 8/28/2013 | -1.42% | -0.47 | 0.64 | No | No |
| 11/20/2013 | -8.47% | -5.26 | 0.00 | Yes | Yes |
| 3/5/2014 | 4.63% | 1.74 | 0.08 | No | No |
| 5/21/2014 | 2.06% | 1.32 | 0.19 | No | No |
| 8/27/2014 | -1.53% | -0.98 | 0.33 | No | No |
| 11/19/2014 | 6.60% | 3.08 | 0.00 | Yes | Yes |
| 3/4/2015 | 0.23% | 1.07 | 0.29 | No | No |
| | | | *Total Significant* | 5 | 3 |

**Source:**  Expert Report of Bjorn I. Steinholt, CFA, and Appendices Thereto

**Notes:**

[1] At 5% significance level.

[2] For each date, the *p*- value is evaluated sequentially by ascending *p*- value against a Sidak value calculated as =1 - (1 - significance value) ^ (1 / number of hypotheses).  In this case, each date is evaluated against a Sidak value of 1  - (95%) ^ (1/19) or 0.0027.  If the date's *p* -value is less than the Sidak value, the date is considered significant (*i.e.* the null hypothesis is rejected); upon reaching a *p* -value that is not significant, the remaining dates are determined not significant. *See, e.g.,* Herve Abdi, "Holm's Sequential Bonferroni Procedure," *Encyclopedia of Research Design,* Thousand Oaks: Sage, 2010.

**Exhibit 2C**
**Significance of Earnings Release Dates Applying Holm-Sidak Correction**
*Proposed Class Period: June 30, 2010 - March 18, 2015*

| Dates Tested by Mr. Steinholt | SQM ADS Actual Return | Mr. Steinholt Event Study Results | | Significance[1] | |
|---|---|---|---|---|---|
| | | *t*- Stat | *p*- Value | Mr. Steinholt Finding | Holm-Sidak Corrected[2] |
| 9/1/2010 | 2.86% | 1.18 | 0.24 | No | No |
| 11/24/2010 | 1.25% | -0.42 | 0.68 | No | No |
| 3/2/2011 | 0.40% | 0.40 | 0.69 | No | No |
| 5/25/2011 | 0.78% | -0.65 | 0.51 | No | No |
| 8/31/2011 | 2.75% | 2.35 | 0.02 | Yes | No |
| 11/23/2011 | -2.79% | 0.82 | 0.42 | No | No |
| 3/7/2012 | 0.25% | -0.51 | 0.61 | No | No |
| 5/30/2012 | -1.27% | 0.34 | 0.73 | No | No |
| 8/29/2012 | 2.18% | 1.87 | 0.06 | No | No |
| 11/21/2012 | -4.96% | -5.37 | 0.00 | Yes | Yes |
| 3/6/2013 | -2.80% | -2.78 | 0.01 | Yes | No |
| 5/29/2013 | -0.91% | -1.59 | 0.11 | No | No |
| 8/28/2013 | -1.42% | -0.47 | 0.64 | No | No |
| 11/20/2013 | -8.47% | -5.26 | 0.00 | Yes | Yes |
| 3/5/2014 | 4.63% | 1.74 | 0.08 | No | No |
| 5/21/2014 | 2.06% | 1.32 | 0.19 | No | No |
| 8/27/2014 | -1.53% | -0.98 | 0.33 | No | No |
| 11/19/2014 | 6.60% | 3.08 | 0.00 | Yes | Yes |
| 3/4/2015 | 0.23% | 1.07 | 0.29 | No | No |
| | | | *Total Significant* | 5 | 3 |

**Source:** Expert Report of Bjorn I. Steinholt, CFA, and Appendices Thereto

**Notes:**

[1] At 5% significance level.

[2] The *p*- values are ranked sequentially by ascending *p*- value and then each *p*-value is recalculated as 1 - (1 - uncorrected *p*-value*)* ^(number of hypotheses - rank of *p*-value + 1). For example, the smallest *p*-value is recalculated as 1 - (1 - 0.00) ^ (19 - 1 + 1). The second smallest as 1 - (1 - 0.00) ^ (19 - 2 + 1), etc. If the date's Holm-Sidak corrected *p*-value is less than 0.05, the date is considered significant (*i.e.* the null hypothesis is rejected); upon reaching a *p*-value that is not significant, the remaining dates are determined not significant. *See, e.g.,* Herve Abdi, "Holm's Sequential Bonferroni Procedure," *Encyclopedia of Research Design,* Thousand Oaks: Sage, 2010.

**Exhibit 3**
**Alleged Corrective Disclosure Dates and Statistical Significance Based on Steinholt Event Study**
*Proposed Class Period: June 30, 2010 - March 18, 2015*

| | Announcement Date | Effective Trading Date | Event | Complaint Citation | Closing Price on Effective Trading Date | Actual Return | Steinholt Event Study | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Abnormal Return | *t*-statistic | Significance (5%) |
| **Alleged Corrective Disclosure Dates in Proposed Class Period** | | | | | | | | | |
| [1] | 1/11/2015 | 1/12/2015 | SII requests clarification from SQM regarding the payment of fees to the former Undersecretary of Mining. | ¶ 204 | $23.53 | -1.67% | -2.20% | -1.33 | No |
| [2] | 2/26/2015 | 2/27/2015 | SQM issues a press release noting that an extraordinary Board meeting had been held and noting the establishment of a special committee. | ¶ 205 | $25.70 | -0.54% | -1.00% | -0.66 | No |
| [3] | 3/11/2015 | 3/12/2015 | SQM announces it has received a request from the Public Prosecutor for its account records. | ¶ 206 | $23.08 | -1.20% | -1.89% | -1.28 | No |
| [4] | 3/12/2015 | 3/13/2015 | SQM issues a press release stating that the Board would provide some information responsive to the Public Prosecutor's request. | ¶ 206 | $22.42 | -2.86% | -0.83% | -0.56 | No |
| [5] | 3/17/2015 | 3/17/2015 | SQM files a form 6-K with the SEC and announces that the Board had agreed to fire the CEO effective immediately. | ¶ 207 | $22.10 | -1.82% | -1.76% | -1.19 | No |
| [6] | 3/18/2015 | 3/18/2015 | SQM issues a press release noting that three Board members resigned the night before. | ¶ 208 | $18.65 | -15.61% | -16.70% | -11.30 | Yes |

**Sources:**

[A]  Amended Complaint

[B]  Expert Report of Bjorn I. Steinholt, CFA, and Appendices Thereto

[C]  SEC Edgar

**Notes:**

[1]  The Announcement Date represents the date the information was released.

[2]  The Effective Trading Date represents the date on which the information could begin to affect the market price. For example, for an announcement on a weekend, holiday, or after the close of market, the Effective Trading Date would be the following trading day.

**Exhibit 4**
**One Day Serial Correlation of Daily Returns for SQM ADSs**
*Proposed Class Period: June 30, 2010 to March 18, 2015*

| | Independent Variable | Observations | Coefficient[2] | t-statistic | p-value | Significance (5%)[3] |
|---|---|---|---|---|---|---|
| [1] | Previous day's returns | 1,187 | 0.09 | 3.08 | 0.00 | Yes |

**Notes:**

[1] Based on a linear regression using daily returns as the dependent variable and the previous day's returns as the independent variable.

[2] Coefficient represents the coefficient of the independent variable in the serial correlation model.

[3] In hypothesis testing, statistical significance indicates the likelihood that an observed event occurred due to chance.  An event that is statistically significant at the five percent level—a common statistical threshold in the academic literature —indicates that there is 95 percent likelihood that the observed effect did not occur by chance.  Generally, in a data sample with a normal distribution and large number of observations, a $t$-statistic with an absolute value of greater than or equal to 1.96 indicates that the result is statistically significant at the five percent level.

**Source:** TW0010846.XLSX, at "Input".

**Exhibit 5**
**Results of Runs Test for SQM ADSs**
*Proposed Class Period: June 30, 2010 - March 18, 2015*

| Observations[1] | Positive Days[2] | Negative Days[2] | Number of Runs[3] | | z-statistic | p-value | Significance (5%) |
|---|---|---|---|---|---|---|---|
| | | | Expected[4] | Actual | | | |
| 1,187 | 572 | 601 | 587 | 549 | -2.23 | 0.026 | Yes |

**Notes:**

[1]  The number of trading days in the period.

[2]  Positive and Negative days are defined as observations in which SQM's ADS price moves in each respective direction. On some days, SQM's ADS price closes at the same price as the previous day (*i.e.* the price change was zero). Because of these "zero days," the sum of Positive Days and Negative Days can be less than the number of observations.

[3]  A run is defined as a series of consecutive days in which SQM's ADS returns are of the same sign (positive/negative).  That is, a series of two days both with positive returns counts as a single run, while a day of positive returns followed by a day of negative returns counts as two runs.  Days with zero returns are not considered to be runs, but they interrupt other runs. For example, three consecutive days with positive, zero, and positive returns would count as two runs.

[4]  The expected number of runs assumes there is no relationship between the prior day's returns and the present day's returns (i.e., the probability of a given day's returns being positive/negative is independent of the sign of the previous day's returns). It is calculated as a function of the Positive Days and Negative Days: (2 * Positive Days * Negative Days)/(Positive Days + Negative Days) + 1

**Source:** TW0010846.XLSX, at "Input".

**Exhibit 6**
**Excess Returns of a Y-Filter Trading Rule Strategy**
*Proposed Class Period: June 30, 2010 to March 18, 2015*

| | | Y-Filter Trading Rule | | | | | | % Profitable Filters |
|---|---|---|---|---|---|---|---|---|
| | | 1.0% | 1.5% | 2.0% | 2.5% | 3.0% | 3.5% | |
| [A] | Trading Rule Return (%) | 32% | 55% | 34% | 33% | 12% | -4% | |
| [B] | Buy-and-Hold Return (%) | -43% | -43% | -43% | -43% | -43% | -43% | |
| [C] = [A] - [B] | **Excess Return under Trading Rule Strategy (Percentage Points)** | **75%** | **98%** | **77%** | **76%** | **55%** | **39%** | **100%** |

**Notes:**

[1]   The y-filter represents the level at which an investor would buy/sell SQM's ADS.  That is, an investor buys when the price increases by at least y% and sells when the price decreases by at least y% (*e.g.,* when the daily return is greater than y% or lower than -y%).

[2]   The "Trading Rule Return" and "Buy-Hold Return" represent the overall returns earned over the period.  It is calculated as (Final Investment Value - Initial Investment) / Initial Investment.

[3]   The "Trading Rule Return" assumes a reinvestment of profits (losses).

[4]   Analysis assumes transaction costs of $100 per trade and an initial investment of 10,000 ADS.

[5]   Analysis assumes the investor buys at the ask price and sells at the bid price.

**Source:** Bloomberg.